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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Exploration Survey for a Railway Connection between India, Siam, and China. By HOLT S. HALLETT, C.E.

(Read at the Evening Meeting, November 16th, 1885.)

Map, p. 64.

I AM come before you this evening to render an account of my late explorations and survey in Burmah, Siam, and the Shan States, which have enabled me to trace out the path for the railway which will, I trust, ere long connect India and China, the two most populous empires in the world.

For the last thirty years or so it has been the aim of the mercantile public at home and in the East, and of the ablest of our Indian administrators, to open up and develop our trade with South-west China. Many projects have been mooted for this purpose, and, as was not unnatural, owing to the absence of geographical knowledge, these projects all aimed at reaching their objective along the valleys of the main waterways of Indo-China. Improved acquaintance, resulting from a number of explorations, has, however, demonstrated them to be impracticable.

Firstly came the route proposed by the famous and indefatigable pioneer of commerce Captain Sprye up the Salween river, whose objective was Ssu-mao or Esmok, the same terminus now chosen by us. Information gained by a Government expedition showed that the Salween river is not only unnavigable, but so shut in by cliffs that all thought of the construction of a railway up its course must be given up.

Secondly came the Irawadi-Bhamo route, at one time strongly advocated by various officials in Burmah, amongst them Colonel Sladen and General MacMahon, both for some time resident at the court of Mandalay, who are both now convinced that any railway connection with China must be led through British Burmah and the Siamese Shan States. The result of this advocacy was the expeditions of Colonel Sladen and Colonel Horace Brown, which, notwithstanding the abilities of the leaders, owing to a variety of causes, were unsuccessful in reaching their goal—China.

Thirdly came the Mékong (or Meh Kong) route, which the French expedition of 1866–68, conducted so gallantly by Doudart de Lagrée and Garnier, proved to be unnavigable above the Cambodian frontier, and was consequently rejected.

Fourthly came the Songkoi or Red River route, from Tonquin. This route was greatly in favour with the French two years ago, and was doubtless the cause of such enormous sacrifices being made in the prosecution of the ill-advised Tonquin expedition. The insurmountable impediments in this river, consisting of rocks, sandbanks, and fierce currents, render this waterway impracticable, except for small boats under four tons, and that only from November to March. The French themselves have, therefore, been compelled to abandon all hope of any considerable trade springing up on either the Meh Kong or Songkoi rivers. Not only this, but their last resource, the idea of laying down a railway along the valley of either of these rivers, has had to be abandoned, owing to the insuperable difficulties that would be met with in the undertaking.

Indo-China is the comprehensive term now applied to the south-eastern section of Asia, lying to the south of China proper, and between the Indian Ocean and the China Sea. It is divided into three natural divisions or compartments: the westernmost drained by the Irawadi, Sittang, and Salween rivers, into the Bay of Bengal; the central drained by the Meh Kong and Meh Nam into the Gulf of Siam; the easternmost by the Song Ka and other minor streams which fall into the Gulf of Tonquin and China Sea. The rivers are separated from each other by parallel ranges of mountains, and their main spurs, generally running in the same direction, which in the western and central divisions is from north to south. The intervening longitudinal river valleys are in places contracted by narrow gorges, between which lie extensive alluvial plains, and below the gorges the rivers pass through vast plains which gradually develop into extensive and rich deltas. Central Indo-China is separated from British Burmah by a range or backbone springing in the eastern Tibetan plateau, and ending with the Malay Peninsula. The lowest level of this range is situated in the neighbourhood of Maulmain, and forms the most favourable point for crossing it and reaching Central Indo-China and Southern China. In the east the main Annam range separates the basin of the Meh Kong from the narrow strip of coast whose short and impracticable streams flow into the China Sea. A minor chain running parallel with the eastern and western mountain ranges, forms a divide between the Meh Kong and Meh Nam valleys, merging southwards into high plateaux which end to the north of the Great Lake of Cambodia.

The hot and moist climate and fertile soil in Indo-China produce a vegetation not yielding, in variety and wealth, to that of any known country. It is the most richly gifted by nature of Asiatic lands. The

deltas of the Irawadi, Meh Nam and Meh Kong, are chiefly rice-producing. The vast plains in the upper courses of the rivers, and the magnificent plateaux of the Shan States are exceedingly fertile. They produce, in addition to rice and other cereals, cotton, tobacco, indigo, sugar-cane, tea, safflower, arrowroot, in fact all the products of a tropical country. Strawberries, raspberries, blackberries, besides buttercups, forget-me-nots, and roses are found on the higher plateaux. A considerable portion of the country is covered with forests in which teak, thingau, pine, thikado, pyngado, padouk, eaglewood, gum-trees, cinnamon, cutch, wood-oil, dye-woods, indiarubber creeper, and many other useful tropical trees and plants abound. The wooded country, and extensive grassy plains, form the breeding ground for elephants, ponies, and cattle. The villages are imbedded in gardens, growing nearly every species of tropical fruit. To the east of the Sittang the hills are generally metalliferous, and if the country is opened up, might well repay their exploration by mineralogists.

Indo-China is chiefly inhabited by peoples of Mongoloid stock, of the Tibetan and Chinese branches, who migrated southwards from Eastern Tibet and China. Other ethnical elements exist, belonging to the Turki, Malayan, Polynesian, Kolarian, and Negrito families, and some are said to be Caucasian.

The climate of this region lying between two oceans, particularly in the southern deltas, is hot, moist, and relaxing, but the nights, owing to the heavy dews, are cooler than in the plains of India. On the Burmese-Shan plateaux, with a general elevation of from 2000 to 3000 feet above sea-level, the winters are comparatively cold, compelling the people to adopt warm clothing. Further north in Yunnan, whose altitude is some 5000 feet, wadded and woollen clothing and furs are a necessity in winter time. The atmosphere thoughout the Siamese Shan States, notwithstanding the heat, is charged with an unusual amount of moisture, day and night, during the year; hence the dysentery and jungle fevers which are prevalent. The greatest heat noted by me was 102° Fahr. at noon in the shade, the thermometer 73½° at daybreak, a difference of nearly 30°. In another instance a difference was noted of 43°, a much greater change than occurs on the sea-board. The variation at Saigon is said never to be more than 13°.

Indo-China lies in the path of the south-west and north-east monsoons. The rainfall from April to October, chiefly due to the south-west monsoon, varies between 50 inches in the Gulf of Siam and 220 inches in the Indian Ocean, while in the interior it varies greatly, being 50 at Thayetmyo, 74 at Tonghoo, about 40 to 50 at Zimmé, and perhaps 75 at Kiang Hsen, where the rainfall is said to be much greater than at Zimmé. The missionaries at Zimmé inform me that the rain there generally comes from the north-east, although brought by the south-west monsoon; this is due doubtless to the configuration of the

country. Heavy showers occur at times in the hills, even in the dry season.

For the past four years Mr. Colquhoun and I have deeply interested ourselves in the subject of the expansion of our trade by linking on China and the intervening countries to India by the means of railways. Previous to either of our survey explorations being undertaken, we had studied the journals and accounts of all travellers who had traversed any portion of the country lying to the east of the valley of the Brahmaputra. We found that the valley of the Irawadi was bounded on the west by a range of hills, which, as it proceeded southwards, spread out into an entangled mass, touching the sea along the Bay of Bengal with many of its spurs. No railway can therefore be constructed, except at a prohibitive cost, from Calcutta along the sea-board towards Rangoon. We found, however, that through the pass used by the Burmese in their invasion of Assam there is a route which would suit admirably for carrying a railway from the Brahmaputra valley into the valley of the Irawadi, and that the railway could be joined on, without meeting any great difficulties, to our Rangoon and Toungoo line having its present terminus at our seaport of Rangoon. There can be no doubt that one of the first steps that should be taken on our annexing Upper Burmah is the extension of our Toungoo line to Mandalay, from whence later on it could be continued either up the Chindwin or viâ Bhamo to the Brahmaputra valley, to form a connection with the Indian lines.

The country east of the valley of the Irawadi is bounded by an arm of the Tibetan plateau, which is riven by the enormous ravines in which flow the Salween, Meh Kong, and the Kinsha Kiang, the principal source of the Yangtsze, the central and main waterway of China. Owing to these rivers and their branches having a general southerly direction, and the nature of the ravines precluding the construction of a road along their courses, the caravan routes from Upper Burmah into Western China have to be carried across a number of passes, of great height and difficulty.

As far south as lat. 27½°, according to the Abbé Desgodins, the hills are snow-capped and the passes certainly higher than 12,000 feet. Between Batang and Litang Mr. Baber relates that the passes are so high that travellers often faint whilst crossing them. In fact, from all accounts the country as far south as Tali-fu is so difficult, so cut up by cañons and high ranges, that no capable or prudent engineer would propose the construction of a railway across it.

Even on the Bhamo route, Mr. Colquhoun and I have by calculation found that although Bhamo is only 250 miles distant in a direct line from Tali-fu, yet a railway would be 600 miles in length to connect these places, if a ruling gradient of 100 feet per mile be selected—the steepest permissible upon any trunk line intended to connect India and China. On this route four passes between 8000 and 9000 feet above sea-level would have to be crested, besides many others of a somewhat lesser elevation.

The cost of a railway by this route would be at least four times as great as that proposed by ourselves.

From our studies we have likewise been led to the conclusion that owing to the many ranges that would have to be crossed, a railway to connect any portion of the Irawadi valley lying in Upper Burmah, or Lower Burmah to the north of Beeling, with South-western China would be of greater length and considerably more costly than our projected line which has its terminus at our seaport of Maulmain.

It was thus forced upon us that the required connection of India and China would have to be made across the hills somewhere in the latitude of Maulmain. From this point there are many routes into the Siamese Shan States, and the hills lying between the valleys of the Irawadi and the Salween ending at Beeling are thus avoided. Having fully considered the matter, we came to the conclusion that either a railway could be taken across the hills viâ Maing Loongyee, which might necessitate the crossing of only one range, or else, if this line were found too difficult, that a railway could be constructed across the two ranges lying between Maulmain and the town of Raheng, situated in Northern Siam, on the Meh Ping river. The passes by this latter route were known to be lower than any others either to the north or south, and indeed were merely 1600 and 2287 feet above sea-level. Myawaddi, the town at our frontier lying between the two passes, is 630 feet above sea-level, which greatly reduces the fall from the first pass and the rise to the second.

Some of the heights above the sea crossed by me are shown on the map, and you will notice that the course chosen for the railway avoids crossing any of the ranges lying between the Meh Ping and Meh Kong rivers. Instead of crossing the hills, I found it practicable to trace a path between them. Thus, instead of rising to about 4000 feet above sea-level, the height of the passes on some of the other routes, the highest level crossed between Raheng and Kiang Hsen is only 1643 feet above sea-level, the height of Zimmé being 1008 feet, of Kiang Hai 1320 feet, of Kiang Hsen 1097 feet, and of Lakon 763 feet. But the immediate rise between the Kiang Hai and Kiang Hsen plains is only 25 feet, between the Kiang Hsen and Penyow not more than 30 feet, between the Penyow and Ngow 354 feet, between the Ngow and Lakon plains 586 feet. The fall from Lakon to Raheng is about 450 feet in a distance of about 93 miles. The travellers who have crossed the various routes from Raheng to Maulmain assert that the routes on the Siamese side are not more difficult than those on the British side. The rise from Maulmain to the crest of the British pass is 1600 feet and the fall to the boundary 970 feet; while the rise to the pass crossed by McLeod is 1657 feet and the fall to Raheng about 2000 feet.

From Kiang Hsen the railway will be produced through the plain that borders the Meh Kong to Kiang Hung, where the river, which is there 1620 feet broad, will be bridged. Kiang Hung is 50 miles from

Ssumao, a large garrison town, and an important entrepôt of trade on the south-west frontier of China. At this point the Chinese system of railways would have their junction.

The Burmese Shan States east of the Salween are believed to contain from a million to a million and a half inhabitants; the Siamese Shan States about two and a half millions; and the Meh Nam valley, to the south of them, about three and a half millions.

The explorations executed show that there is no other route by which a railway can be carried at so moderate a cost through the Siamese Shan States to China, while it is now universally acknowledged by those who have studied the subject that if a railway is to be constructed it must be carried in this direction.

The Shans, who inhabit the Shan States through which the railway will pass, are a cultivated and lettered people, free from caste, industrious and energetic, hospitable and frank towards strangers, eager for free trade, and possessing a marvellous capacity for travelling as petty traders. They are found throughout British Burmah and Upper Burmah, as well as throughout the Shan States and Yunnan, carrying their goods across seemingly impassable hills, and extending trade in all directions by every means in their power. The hill tribes are a hard-working, manly, truthful people, living on the best of terms with the Shans, excellent agriculturists and handicraftsmen, many of them blacksmiths and miners, great growers of indigo, cotton, tobacco, and tea, as well as extensive breeders of cattle. To show you how civilised the people of the country are, I need only tell you that the Chief Commissioner of British Burmah assured me that travellers were perfectly safe in the Shan country and need not take a guard further than our frontier.

Having found during my exploration that the Thoungyeen, Salween, and Maing Loongyee rivers for some distance ran in precipitous gorges, and that these gorges would have to be engineered at great cost, or avoided by crossing high ranges of hills if a route viâ Maing Loongyee were chosen, I came to the conclusion that it would be far less costly to carry the line from Maulmain to Raheng. I therefore decided to direct my efforts to the exploration of the country lying between Raheng and Kiang Hsen, a town on the Meh Kong river, so as to ascertain the cheapest and best line for the construction of a railway.

After leaving Maulmain and crossing the hills by Maing Loongyee to Zimmé, I made that town my headquarters, and, proceeding by various routes, crossed the passes lying between it and Kiang Hsen. I learnt from the missionaries stationed at Zimmé that for about 40 miles the Meh Ping itself ran in a gorge from Meut Kha southwards, but that there was a route viâ Muang Li by which this defile could be avoided. This route was traversed by McLeod on his journey back to Maulmain in 1837, and there is little doubt that a railway could be carried by

this route, or by one between it and the Meh Ping, passing the silver-mines, at no extravagant cost, from Zimmé, to meet our proposed railway above the juncture of the Meh Wung and the Meh Ping.

Every assistance was given me in my studies of the country by the various princes and chiefs whose states and districts I traversed. All were anxious to have a better trade-route than at present exists opened through their country to British Burmah. The old King of Zimmé, the princes of Lakon, Lapoon, Kiang Hsen, Kiang Hai, M.* Fang, M. Pow, M. Ken, M. Ngai, and Kiang Dow, all assured me that every facility and help would be given by them towards the construction of a railway, that nothing would please them better than such improved communications, and that they earnestly hoped to see our proposal soon carried out.

In Eastern countries delay is perhaps the greatest difficulty that travellers have to meet, and in Indo-China, where travelling during the rains is dangerous, not merely from the floods of the unbridged rivers, but from the malaria of the forest-clad hills, delay is still more to be feared, and the more necessary to avoid. To show the goodwill of the princes and people, I need only say that I was not needlessly detained one hour during the whole of my journey, and all aid required in the shape of guides, information, the supply of conveyance and commissariat, was willingly rendered. At times, when there was difficulty in procuring elephants, the best in the studs of the princes themselves were hired to me at a most reasonable cost.

From state to state I was conducted by a chief or judicial officer, and sometimes by both, to ensure that I was properly provided for on my journey, and that the best guides and information were placed at my disposal. These chiefs put themselves out of the way to gain me information. They called in the most reliable people for me to cross-question, and by their help I was enabled to collect the vocabularies of the different races inhabiting the country, which will be published as an appendix to this paper.

I found that there are two distinct races of Lua (or Lawa); one, which I shall term the "Baw Lua," is acknowledged to be the aboriginal race of the country. This race is now chiefly found in the Maing Loongyee valley, and the hills and plateau surrounding it, where, according to the account furnished to me, there are twenty-nine villages. I was told that in this locality there are 9000 of them, as well as 15,000 Karens, 10,000 of whom belong to a wild, timid race, cultivating only "toungya," or hill-cultivation, and who move their villages every second year or so. In case of an epidemic, they move at once to a fresh site. The Shans in this part of the country are much fewer than either the Karens or the Luas, and I was assured that there are not more than 4000 of them in the Maing Loongyee valley. The Baw Luas are found

* Muang.

in the hills as far south as the latitude of Bangkok, three or four of their villages existing on the western branch of the Meh Klong river. The other race of Luas is the Kiang Tung Lua, known by the Burmese as the "Goung-pyat," or "Head cutting-off," Luas. They come from the plateau and hilly region north-west of Kiang Tung, and are a much more stalwart and fine-looking race than the Baw Luas, whom they resemble neither in language nor aspect. The Baw Lua has a prominent, well-formed, Caucasian-looking forehead. A perpendicular line from the forehead would leave only the tip of the nose and lips slightly protruding from the face. The root of the nose is deep-set, and is often straight and flat for two-thirds of its length, but in other cases the nose is well formed, although still more or less Tartar-looking in front. The cheek-bones are high and broad, and the eyes, far from having the oblique appearance of the Tartar, are even more open at the inner corners than those of the European. The chin, looked at sideways, is much more angular than that of the Burmese or Shans. The bottom of the ear is generally on a level with the bottom of the nose. The lower lip, in some of them, protrudes beyond the upper, but this can hardly be called a characteristic. The hands and feet are small, and their limbs more shapely than those of most of the Shans. The Kiang Tung Luas are hardly distinguishable from the Burmese Shans, and they avow that they are an entirely distinct race from the aboriginal Luas, and that they had gradually pushed their way southwards. Their villages are to be found scattered about along the basin of the Meh Low, and two villages have lately been erected in the hills to the east of Viang Pow, where there are likewise three Karen villages. The Moosurs, sometimes called Moso, who call themselves Lahoo, and come from Western Yunnan and Eastern Tibet, have now five villages on the Meh Khoke, above Kiang Hai, and also one village near Kiang Hsen. Their principal town is Muang Kha, which lies at the head of the Meh Kha, which empties into the Salween, about one month's journey north-west of Kiang Tung. They have a decidedly Turki appearance, having oval faces, but have evidently been crossed at some period with the Shan race.

Between Kiang Khong and Luang Prabang, on the left bank of the Meh Kong river, the towns and villages are occupied by various races, Kamooks, Kameits, Kors, Karens, and Shans under Muang Nan and Luang Prabang. The first two live in separate villages, have distinct languages, but are of much the same personal appearance and stature. They belong to the dwarf races of Indo-China. Their height, as measured by me, did not exceed 4 feet 9 inches. They are found working under our Burmese foresters in all the Shan teak forests. They are well-formed, with pleasant faces, straight and full eyes, and differ greatly from the hill races of Western Indo-China. They seem to be of a buoyant, easy-going temperament, and are hard working, and make excellent labourers, woodcutters, and elephant-drivers.

The geology of the country resembles that in the neighbourhood of Maulmain. The main ranges of hills are gneiss and granite, often covered on their slopes by slate, shales, argillaceous rocks, sandstone, and limestone. The lower ranges are of a similar formation, and belong to the lower carboniferous and Silurian groups. Huge masses and straggling ranges of mountain limestone, with cliff-faces and serrated peaks, crop up in many places, and add greatly to the beauty of the scenery. The country is undoubtedly metalliferous, and precious stones are found in certain parts.

The soil, as might be expected from such varied formations, differs greatly in its constituents. Thus certain regions are highly suitable for cotton, others for tobacco, tea, &c. Tea is found on many of the hills as an indigenous plant. As soon as I had crossed the crest of the main range east of the Thoungyeen, tea was brought me by my Shan interpreters, seemingly the same variety originally found in the Assam hills, growing to a height of five to seven feet. As is the case in Karennee, I found some of the hills plateau-topped, with their summits covered with rich soil and well watered by springs, and cultivated by settled communities. The freaks of nature in the limestone region evidence markedly subsidence. Near the sacred cave of Tum Tap Tow, in the Fang plain, the ground had sunk in certain places, which had become large ponds. Even on the hill summits hollows of great depth occur, seemingly formed by the same action. The whole course of the Meh Ping throughout the rapids was at one time under ground, as is evidenced by the aspect of the precipices on either side of the river.

The Meh Ping takes its rise in a huge mountain called Loi Tooey, which also forms the source of the Meh Pai and Meh Hâng, which flow into the Salween, and of the Meh Teng, entering the Meh Ping. From one of its arms, in about the latitude of Zimmé, springs the Maing Loongyee river, and all the hills lying between the Meh Ping and Thoungyeen have their origin in the same spur, which continuing southwards forms the backbone of the Malay peninsula. Loi Tooey itself is but an offshoot of the range bounding the east of the Salween, with which it is connected. The Meh Hâng passes under the connecting spur.

The country between the Meh Kong and the Salween is divided into several branch river-basins by more or less detached ranges, or knots of hills, whose spurs contract the rivers at certain points of their courses, leaving plains of great extent between these points of contraction. On the Meh Ping above Zimmé many such plains exist, notably those of Ngai, Dow, Soon, and Nah. The Zimmé plain commences some miles to the north of the Meh Teng, and continues to Meut Kha, a distance of 70 miles. Similar plains of great size are met with on all the other rivers. In many places, owing to the continuous supply of water from the hill streams, two crops of paddy and other produce are

raised. The Shans fully understand the art of irrigation. Large water-wheels are met with on some of the large rivers. I counted a large number between Muang Haut and Zimmé on the Meh Ping. These wheels, 10 to 12 feet in diameter, are of very light construction, being framed of split bamboo, with small bamboo buckets to carry the water.

Owing to the terrible warfare which so long ravaged this region, situated between Burmah, Siam, Cambodia, and Annam, a great part of the country is still comparatively sparsely peopled, and many large plains have been "bunded" or embanked across the streams by new settlers, and are used as fisheries. Large quantities of preserved dried fish are cured at Kiang Hai and other places, and conveyed through the interior to Zimmé. The fishing is carried on largely by torchlight at night, the torches serving to attract the fish. The Shan custom of irrigating their fields by cut canals tends in time to reduce the size of the main streams in the upper portions of their courses, when if the plains are thrown out of cultivation large areas of country become subject to floods during the rains. This I found to be the case with some portions of the Hsen and Fang plains, which are in places now under water in the rains. The remains of numerous large cities met with, scattered about the low hills bordering the plains, and now covered with tall trees, bespeak that the country at one time afforded means of subsistence to a very large population. Many of these cities are roughly indicated on the map, and many more exist, the names of which are now unknown. They are all surrounded with deep double ditches, the earth from which forms the parapet, on the top of which palisading was erected. The cities of Manola, or "Silver Mountain," to the west of Kiang Hsen, are built upon three separate knolls, each about half a mile in diameter. The ditches are about 100 feet wide and 40 feet deep from the top of the ramparts.

Many of these cities are said to have been built by the Luas, the aborigines of the country, whose dominions seem to have extended from Muang Pak, "the pumpkin country," situated south of the Kiang Tung plateau, as far southwards as the Gulf of Siam. There are many legends of the wars carried on between them and the Shans, and the guardian spirits of the country who are yearly sacrificed to by the Shans and other races, are without exception ancient Lua kings.

Although Buddhism is the ostensible religion of the country, spirit-worship is the cult which has a real hold on the people. The spirits worshipped have, according to the people, in some previous existence been human beings. That this worship springs chiefly from dread may be shown by one instance. When the head Buddhist monk of a Shan monastery dies, every one who has at any time received instruction from him must now and then make offerings to his spirit. If they do so, his spirit will befriend them, but he is certain to avenge himself for any want of attention. Another superstition of the people is that every image of Buddha erected in a temple is inhabited by a spirit, and that

as long as offerings are made to that image the spirit is beneficent, but it at once becomes malignant if neglected. Another belief is that a certain post of every house is inhabited by spirits, those above the floor being well disposed, and those below evil.

Magicians, witches, ghouls, and in fact all mythical beings, form part of the people's faith, and greatly add to their fairy lore. As a specimen of their legends I will relate that of the magician who lived on the hill behind Lakon. Long, long ago, before the time of Gaudama Buddha, Pome Ma Rat Tsee, a famous magician and doctor, visited Lakon and informed the princes and people that by his medicines and charms he could add beauty and restore youth and life to any one, however they might have been dismembered and mangled. A hideous old prince, who was tottering to the grave, and longed much for a renewal of his salad days, begged the magician to experiment upon him. The doctor accordingly made mincemeat of him, and, preparing a magic solution, dipped the fragments of the prince into it and placed it over his fire. After performing the necessary incantations, the prince, rejuvenated and a perfect beau, was handed out of the pot. He was so pleased with his new appearance that he entreated the magician to reperform the operation, and, on his refusal, insisted that he should do so, as he expected, the first process having been so successful, great benefit thereby. The magician, annoyed at his persistence and his covetousness, accordingly minced him up, and put him in the pot, where he remains to this day. At least so the tale runs. One strange superstition, more connected with Buddhism than Shamanism, is the propping up of *peepul* trees and their branches, the tree — the most sacred of the Buddhists—being renowned, owing to Gaudama having become a Buddha under its branches. This observance has become quite a mania with the people. Whether the *peepul* trees require support or not, great numbers of sticks are invariably placed under the branches and against the trunk. In many cases I noticed it was the *peepul* that supported the "support." Charms to delude, and offerings to propitiate, the spirits of the jungle were found at all the *pangs*, or halting places, and any ills that may befall the traveller are put down to their malignant action. No single man will travel by himself, as should the same man both draw water and tend the fire, evil would certainly come to him.

At all the cattle camps bamboo pegs are driven in, encircling the camp and connected lengthwise by rattan or some strong creeper, the people believing that tigers, on coming into contact with the yielding cane, suspect a trap and retire. Foot-and-mouth disease is prevalent in various parts of the country, owing to no precautions being taken against its spread. Whilst at Muang Fang a large herd of cattle passed through, several heads of the herd being left behind sick with the disease, which was nearly certain to be propagated by this herd

at each halting-place. Owing to the large swarms of gad-flies infesting each cattle camp, other positions are chosen by travellers to halt. The elephant and gad-flies are such pests in the tree-jungle at the commencement of the rains that it was with great difficulty that I could keep my attention centred upon my survey work and observations I was taking. The elephants protect themselves with leafy branches torn off the trees along their path. The ordinary jungle flies were so numerous in places at this time that I have seen the backs of my followers covered with them. Butterflies of many beautiful varieties were numerous, and so courageous and persistent, that I had often whilst writing up my notes to shake off the ever-returning visitors from the hand which I was using. Great precautions are taken not to camp under ordinary trees for fear of their being blown down or of their branches falling during the night. As a rule the camps are placed under the shelter of enormous *thingan*, *kanyen*, *thitsee*, and other trees, some of them being 200 feet in height, and 150 feet from the ground to the lowest branch.

It is exceedingly difficult to estimate, even approximately, the amount of caravan traffic passing through the Siamese Shan country, as caravans come and go in so many directions, and there are often several caravan-routes to each pass. At certain places where the caravans are compelled to take one path at a pass, the roadway is worn down as much as 10 feet. Goods are carried on land by men, mules, ponies, oxen, and elephants, and by boats and rafts on the rivers. The elephants and "leaders" in the oxen-caravans have bells attached to them, so as to permit their being traced in the jungle, and to give due warning of the approach of parties from opposite directions in the narrow hill-paths, where often there is a sheer descent alongside some hundreds of feet in height. The traffic of the country has been treated in my addresses to the Chambers of Commerce, where I have shown that the existing cost of carriage as compared with that by railway is at least 50 to 1, and in certain cases, for instance grain and salt, as much as 100 to 1.

Owing to the denseness of the jungle, although game abounds, it is difficult to make a bag without a number of beaters. Deer are common, and on the march frequently spring up close to the elephants. These and tiger were heard around us nearly every night. At first my Burmese and Madrassee followers were most uneasy at the close proximity of the tigers, and so frequently begged for my gun to fire off, not at the tigers but to frighten them away, that I found it at last absolutely necessary, in order to secure a night's rest, to leave my guns behind at Zimmé.

Wild pigs are a pest to the people, as they at times root up the fields and destroy the crops. Jungle fowl, quails, and hares were met with in the day's ride, and the cry of peacocks was frequently heard. Gibbons were almost the only monkeys seen, but they were numerous. Wild black cattle, said to be larger than buffaloes, are found in the

unoccupied portions of the Kiang Hsen plain, and the rhinoceros exists in the low swamps bordering in places the Meh Khoke. Wild elephants abound in the unsettled portions of the hills. The large Kiang Hsen plain was, I was told, entirely under cultivation before the capture and destruction of that place in 1797 by the Zimmé Shans, and the city itself was only reoccupied in 1881. It was 8400 feet long by 3300 feet broad, and contained no less than fifty-three monasteries. Teak and other trees have sprung up within the walls of the town, and tigers are even now found occasionally prowling about inside the enclosing walls of the city.

LOI CHAUM HAUT, FROM THE PLAIN OF KIANG DOW.

Many large villages have been lately erected on either side of the boundary that has been agreed upon to the north of Kiang Hsen, and that plain, as well as those of Fang, Hăng, and Hâng, which were until lately deserted, are being rapidly brought under cultivation.

The scenery in the Shan States is most varied and beautiful. The vast plains, where inhabited, are divided into large fields by fringes of fruit trees and plume bamboos, amongst which nestle the villages or hamlets. Magnificent clumps of plume bamboos and palms, enclosing houses, are likewise dotted about the fields.

With the view thus shortened by the gardens, without actually marching through the country, it is impossible to realise the extent of its cultivation.

VIEW OF NORTH END OF ZIMMÉ PLAIN.

The big spurs from the main plateaux or range have often their extremity of much greater height than their main body. Many of them are 7000 to 9000 feet in height. The hill behind Kiang Dow forms enormous precipices. The Kiang Dow hill is said to be inaccessible. There is a legend, however, that a lake called Ang Salome exists at its top, and that Gaudama in a former existence was born on the Chaum Haut mountain, about 10 miles distant, and that water was conveyed to him by means of an aqueduct. As one hill is about 9000 feet high, and the other 8000 feet, the engineering of this waterway must have been a creditable piece of work. The hill behind Zimmé rises so gradually from the plain that, although some 7000 feet in height, it does not appear anything like that height, in fact not more than as many hundreds of feet. Between the rapids and Zimmé, glimpses are caught of some magnificent plateau hills lying to the westward, one of which, seemingly 9000 or 10,000 feet in height, is pictured on the wall from one of my sketches. In front of it is the Tiger's Head hill.

The scenery on the rapids is the grandest and most beautiful I ever saw. The cliffs are generally of limestone—mottled, orange, pink, brown. Wherever trees can get a hold, vegetation is to be seen. Huge caves exist, some of them thousands of feet above the water. Often the face is rounded with towers like some old Norman castle. One hill has the appearance of a huge sphinx; another is crested with three enormous ears. One is called the "Cat's Hill," and another the "Horse's Hill," owing to the time-worn hieroglyphics on their faces resembling those animals. Many of the cliffs are overhanging and have stalactites pendent from the face as well as beautiful dripping mosses and lichens. The river in the gorge is sometimes reduced to 80 feet in width, and tears fiercely down the rapid. The hills are often of such a height, and so near together, that the sun can only penetrate for a few minutes in the day into its depths. In one place a rapid has worn out a recess 30 feet deep and three-quarters of a mile long, where the boat rushing under the cliff had to be kept in its course by two men at the rudder and four men with poles to prevent its being overturned or dashed to pieces.

There are thirty rapids on this portion of the river. Some of them are shot in the manner described, and others descended by means of a rope, twelve men being employed to check the descent of each boat. The craft had bamboos attached to the sides to prevent them capsizing in the rapids, and pilots are taken on at Meut Kha to guide them safely through the rapids. The Meh Ping throughout its course is seldom more than two feet in depth.

There are two distinct legends accounting for the names given by the people to the various rapids. One is about a princess of Nokeburri proceeding up stream to Lapoon to marry a Lua king. The other, which I will now relate, concerns the elopement of a Shan princess from some ancient city that once existed to the east of the Meh Ping. This legend runs as follows:—A young princess being crossed in love by the refusal of her parents' consent to her marriage with a nobleman, determined to levant with her lover. She therefore mounted behind him on his pony one fine moonlight night and off they set towards his home. When nearing the Meh Ping they heard her father with his followers in pursuit. A cliff called Pah King Soo bordered the river. The princess, nothing daunted, urged her lover to leap the pony over it into the river, and on his hesitating, sprang in front of him and forced the pony to the leap. From that time they lived only in story, and the places where their bodies, whip, saddle, harness, pony, &c., were stranded were named accordingly.

During the first part of my explorations I was accompanied by Dr. Cushing, of the American Baptist Mission, who had previously travelled through some of the Shan States, and is known as the best Shan scholar and the highest authority upon the Burmese Shans. Afterwards our party was joined by Dr. McGilvary, of the American

Presbyterian Mission, and still later by Mr. Martin, of the same mission. I most gratefully acknowledge the assistance that I received from these gentlemen as interpreters, and was highly pleased at seeing the esteem that Dr. McGilvary, Mr. Wilson, Dr. Cheek, Dr. Peoples, Mr. Martin, and the lady missionaries were held in by not only their converts, but by the princes and people throughout the country. Their influence in eradicating the most deleterious superstitions of the people was evidenced by many of the princes and chief men in cases of illness calling in their aid instead of that of witch-finders and conjurors. By their having checked the ravages of small-pox through bringing vaccination into the country, and by their open protection of so-called witches and wizards who had had their homesteads ravaged and had been driven from their villages. By their unwavering kindness, unselfishness, conciliation, and by their tact, they had gained the good-will of all, and were looked upon as benefactors by many people outside their own flock.

The branch line that we propose to connect the Siam-China railway with our seaport of Maulmain would have Maulmain with over 50,000 inhabitants at one end, and Raheng, with about 20,000, at the other. It would tap at Raheng the traffic from the Shan States, Siam, and China. The main line would pass through or near 481 towns and villages, would have one terminus in the seaport of Bangkok, which contains about 500,000 inhabitants, and the other at Kiang Hsen, only 190 miles from China, situated in a vast fertile plain, which is now being resettled and brought under cultivation by both the Shans of Upper Burmah and Siam. The main line would pass places within four days' journey of 12 miles a day from Muang Nan, three and a half days from Muang Peh, three days from Lapoon, and not four days from Zimmé. The river between Kiang Hsen and Luang Prabang is navigable. The railway would thus serve not only the Shan States through which it passes, but also the neighbouring States, to which branches might be made after the completion of the main line. If we take Upper Burmah, the railway could be carried on to Ssumao, the gate of China.

The leading commercial communities of the country who have supported the explorations with the necessary funds, after a critical examination of the subject, have expressed their opinion that the railway is a practicable undertaking, and that its execution would greatly aid in securing for us the most important outlets for the extension of our commerce still available. The Chambers of Commerce and the press are urging the matter upon the attention of Government.

I need hardly say that it is the most earnest desire of Mr. Colquhoun and myself, who have throughout given our services gratuitously in this undertaking, to see our labours result in the realisation of what has been our aim, the connection by railway of the two most populous empires in the world, and thereby to secure the lasting expansion of British commerce.

After the paper,

Mr. ARCHIBALD R. COLQUHOUN said: In the account just given you by Mr. Hallett of the exploration which he has carried out with such signal ability, nothing has been said of the discouraging conditions under which he undertook the mission. Little reference has been made to the large extent of most varied work executed, no mention made of the fatigue and exposure undergone. On the refusal of the Government of India to co-operate with the Chambers of Commerce in this exploration or to grant my services for the purpose, Mr. Hallett volunteered to undertake the command of the expedition until such time as I might be able to join him in the field. A special mission in China and Indo-China during the Franco-Chinese hostilities detained me two years, however, and I was thus unable to join the expedition in the field. Mr. Hallett, a friend of old standing and a brother-engineer in the service of the Government of India, had with myself for years past interested himself in studying the problem of railway communication between India and China. Having had a large experience of the construction of railways at home, and been for years in charge of some of the most important divisions of British Burmah, and moreover being a practised surveyor, he was eminently fitted to carry out a general study of the country requiring examination, in order to select the most fitting part for a railway. Mr. Hallett executed, partly in boats, but chiefly from the back of elephants, about 1500 miles of survey, and explored about 2500 miles of country. He has fixed the position of all the hills within many miles of his route, noted the geology, taken observations of the variation of temperature, aneroid sections of the country checked by frequent observations with the boiling point, and mapped down every turn and twist of his path. A mass of information regarding the past history and present condition of Indo-China has been obtained, and the vocabularies of the various races met with have been procured. The cartographer of this Society, to whom has been entrusted the work of plotting the surveys, informs me that he was astounded and delighted at the singular accuracy and completeness of Mr. Hallett's work, the long circuits made from Zimmé closing in with remarkable precision. He had never seen such work before. All this, I maintain, is work of which any man may well be proud. These results, however, I need hardly tell you, were secured not without some sacrifice of health, as well as by the exercise of a rare capacity and devotion to his work. I met Mr. Hallett at Bangkok on the return from his journeys, and can vouch for the ordeals he went through by the condition in which he and his party returned. His native staff, Burmese and Madrassees alike, were suffering from fever and diarrhœa, while Dr. Cushing had been compelled at an early period to return through illness, and the other missionaries who accompanied Mr. Hallett, had contracted severe fever. Mr. Hallett himself had suffered considerably in health. From personal experience of this and neighbouring countries, I can bear testimony to the grave difficulties overcome, the fatigues and exposure incurred, and all with the tact and patience and courage which distinguish the explorer. His admirable work has shed a bright ray of light upon a hitherto dark blot in our geographical knowledge—Central Indo-China. I trust, and firmly believe, that it will shortly be followed up by the early realisation of the connection of India and China, now acknowledged to be of such vital importance to this country.

Colonel YULE said that what he chiefly desired to say to-night would be a few words about Mr. Colquhoun himself, his merits, his labours, and the public obligation to him. When five years ago Mr. Colquhoun first opened communication with him, that gentleman was a young engineer in the Public Works Department in Burmah. He wrote to him (Colonel Yule) mentioning his desire to enter on some exploration in Indo-China, and asking counsel about it. Some time after

that Mr. Colquhoun came home, and he (Colonel Yule) then had the pleasure of making his acquaintance. Subsequently he performed his well-known and successful journey, and after spending some time in England in organising the project which had just been described, he was diverted to another branch of public service, and went to Indo-China as a Special Correspondent of the *Times*. He (Colonel Yule) had watched Mr. Colquhoun's career from the time that he first heard his name, and what he regarded with the greatest satisfaction was the constant growth that was seen in his capacity, in his power of expression, and in the wideness of his views. He thought that every one who had read Mr. Colquhoun's letters from the seat of war in Tonquin, and from the ports of China, must share in that feeling. No doubt at first one of his great objects was simply to distinguish himself, and perhaps to win the medal of the Society; but ultimately he set before himself steadfastly the great object of opening communication between Western China and the British possessions. He had followed that up most persistently and vigorously. Mr. Hallett had been his worthy coadjutor, and had carried on the practical operations where Mr. Colquhoun himself could not be present. All Mr. Colquhoun's letters and papers evinced a strong English patriotism. He was constantly looking to the interests of his country, was susceptible to the honour of his country, and ever kept his eye on those workshops where weapons seemed to be forging against English interests or honour. As to the projects themselves described in the paper, the speaker could not now say much, for what he had to say would probably have to be said elsewhere. He felt the difficulties that beset them—not engineering difficulties, but of quite another kind; still, he could not but hope that events which were even now upon the wing might help to clear the way for the execution of the projects which Mr. Colquhoun had at heart, and on which he and Mr. Hallett had expended an amount of thought and energy which he (Colonel Yule) could not believe would be in vain.

Mr. J. H. Tritton (Chairman of the London Chamber of Commerce) said that merchants in London who were not travellers in the Far East, and who had only a stay-at-home knowledge of the subject, had been for some time regarding the subject as a matter of transcendent importance. In addition to considering the junction of our great Eastern dependencies with the Empire of China, the different Chambers of Commerce throughout the country had been considering how best to overcome the difficulties which our near neighbours and friends had been placing in the way of our trade. It behoved England, as a commercial nation, to look further afield and see whether or not there were vast countries into which our trade might flow; and they had come to the conclusion that there were such countries. It was therefore their duty, as far as possible, to investigate this matter. To this end merchants called in the aid of commercial geography. They had been told that there were at least three motives for exploration. The highest was that of missionary enterprise, and commerce owed a deep debt to missionary schemes. The next motive was the scientific one, and the third the commercial motive. He trusted that he was not trenching on too delicate ground when he volunteered to bring this commercial motive into prominence. There was every reason why this subject should be ventilated. It had been talked of a great deal, and surely the time for action would sooner or later come. Events were travelling very fast. At the present time there was an expedition on foot which might produce great results. The Prime Minister, at the Guildhall banquet the other night, intimated that the great country of China was now apparently spreading forth her hands westward, looking, contrary to nature, for the rising of a sun in the west, and he hoped that England and China would be drawn nearer and nearer together. The merchants of London were delighted to hear of that, and he believed he was correct in saying that another great country in that

part of the world—Siam—was now coming to the front. Those countries were now beginning to welcome the means of further trading, and he ventured to say that the time was coming when this great question would pass from the region of thought into that of action, and so benefit the trade of England.

Sir RUTHERFORD ALCOCK had for a long time taken a deep interest in this subject, and congratulated Mr. Colquhoun and Mr. Hallett on the result of their arduous labours. The great importance and value of those labours were now generally recognised. During the last thirty or forty years constant efforts had been made to find a practicable route for trade between British Burmah and China. In the treaty concluded with the King of Burmah in 1769, there was a stipulation which proved how much attention was paid to the subject even at that early date, for it was stipulated that the King of Burmah "should re-open the golden road to China." That golden road had been searched for ever since, and in 1795 a British envoy was sent to Ava with the same object. Captain Sprye came later on, and for thirty years there had been incessant attempts to open a road. The importance of this subject appeared to him to be too much forgotten at the present time. If he were a candidate on the hustings he would be disposed to remind working men that their wages, their comfort, and their security were vitally dependent on our commerce, our ships, our colonies, and the maintenance of our empire as a whole. If there were an alliance of two or three great Powers against England, and they were able to beat our fleet, and interfere with our commerce, the working men of England would be starved out in six months, and the sinews of this nation, which was a trading nation, would be destroyed. His residence for so long in the East had probably directed his attention particularly to this subject; he was firmly convinced that if the line for which Mr. Colquhoun and Mr. Hallett had worked so arduously, were established across the peninsula through Siam and the Shan States, and a practical route was formed by rail to the Chinese border, English commerce would be greatly benefited. The times were very propitious for it, and some recent experiences led China to welcome the approach of British trade to their border more than they had ever done before. The Chinese had learnt by experience that they might have worse neighbours than the English. There was also that going on in Burmah, which would most effectually remove any difficulty which might arise from that quarter with reference to the line the road might take. England, he thought, had hesitated too long, but at last the time had come when they had to seize the propitious moment and press this matter forward. Merchants should not only memorialise the Government, but they must be prepared with the capital to carry out the enterprise.

Mr. W. WINCKLER, C.E., asked whether the country between the Brahmaputra and the Irawadi watersheds had been explored; what was the length of the line from Moulmein to Raheng; and what sort of harbour there was at Maulmein.

Mr. HALLETT replied that with regard to the watershed between the Brahmaputra and the Irawadi, Mr. Jenkins, Dr. Bayfield, and other officers had been into that country. The lowest pass between the Brahmaputra and the Chinwin branch of the Irawadi was known to be about 2500 feet. The pass crossed by Mr. Peal was about 3500 feet; the height of the Brahmaputra valley at the foot of the pass being about 500 feet above sea-level. Therefore the watershed was of no consequence in these days of engineering. Vessels drawing 24 feet could get up to Maulmain until three or four years ago, but owing to the Government neglecting to dredge a small bar that has formed in the channel, such vessels have now to partly unload below the town. The distance from Maulmain to Raheng is about 160 miles.

The PRESIDENT (the Marquis of Lorne) said that, owing to recent occurrences, the country described by Mr. Hallett was of peculiar interest, as being the highway between India and China. Mr. Hallett had successfully turned the mountains and

found a practicable route. He had mentioned the extreme cordiality with which his plans and journeys had been forwarded in the kingdom of Siam. The meeting was fortunate in having present the Minister of Siam. He hoped that His Royal Highness would accept the thanks of the Royal Geographical Society for the courtesy shown to British travellers in the great work which would certainly benefit Siam, a kingdom which had shown a most remarkable love of progress and an intelligent appreciation of the endeavours to make her richer than she was at present. All would agree that Mr. Hallett and Mr. Colquhoun had prosecuted their researches in a disinterested spirit for the welfare of the Empire, a spirit which was characteristic of the Indian Civil Service. It would perhaps be premature to speak with confidence of the prospects of the railway, but it was probable that it would pay, being connected with the port of Maulmein, and passing through a territory containing 481 towns and villages. Judging from the experience of Indian railways, with regard to which the Government had not found it necessary to continue the system of guarantees, a railway through Siam might pay, and, in time, the inveterate exclusiveness of the Chinese might be broken down. Gentlemen in London connected with commerce, had always said, "Stick to Colquhoun's line;" and it was quite right that the Royal Geographical Society should do all it could to encourage the opening up of trade. The President of the Manchester Chamber of Commerce had sent a letter, in which he said he had always taken the deepest interest in the opening up of trade to China, and added, "Several of my friends interested in the scheme proposed by Mr. Colquhoun and Mr. Hallett . . . request me to support it as President of the Manchester Chamber of Commerce, which has always taken deep interest in endeavouring to open up trade with Western China. Had I been able to attend the meeting, I should have given expression to the view, entertained by so many mercantile men in Lancashire, regarding the practical value to our commerce of these expeditions of Mr. Colquhoun and Mr. Hallett. The importance of opening new markets and of developing those already existing, renders necessary a close alliance between geography and commercial interests. Hitherto our geography has been too much devoted to geographical aspects and not sufficiently to the aim of being of practical value. . . . The Chambers of Commerce and the Geographical Societies might organise together important expeditions, in the same manner as that of Mr. Colquhoun and Mr. Hallett, of which part of the expense was paid by members of the Chambers of Commerce of Manchester and Glasgow. The explorations of these gentlemen show how such work should be carried out; besides serving the interests of commerce they have added greatly to our general and purely geographical knowledge. In our Chamber there is a strong feeling that Mr. Colquhoun and Mr. Hallett should receive from Her Majesty's Government some recognition of the services they have rendered to the commerce of the country, and which, I am informed, have been gratuitous. I must apologise for intruding my views at this length.—JAMES F. HUTTON."

His Royal Highness the SIAMESE MINISTER then rose, and said that it had given him much pleasure to accept, in a private capacity, the President's courteous invitation to be present at that meeting, believing, as he did, that the Royal Geographical Society helped to cultivate peace and progress and mutual sympathy between all nations, whether Eastern or Western.

On Bathy-hypsographical Maps; with special reference to a combination of the Ordnance and Admiralty Surveys.

By E. G. Ravenstein.

Maps, p. 64.

The bathy-hypsographical map, which aims at exhibiting by means of contours or otherwise the configuration of the solid surface of the earth, is a product of modern times. This is only natural, when we consider that instruments capable of measuring heights and depths with some approach to accuracy, and yet expeditiously, have only within a comparatively recent period been placed at the service of geographical explorers and surveyors.

It was Pascal who showed in 1658 how the barometer might be utilised as a hypsometer, but that instrument only became in reality available when De Luc published his formula in 1722. On the other hand, although mariners have heaved the lead from immemorial times, it is only since the invention of deep-sea sounding apparatus, like that of Brooke (1852), that we are in a position to delineate the configuration of the ocean bed with some confidence in the general correctness of our results.

Charts indicating the depth of the sea are of more ancient date than maps giving the heights of mountains. It was Gerard Mercator who first introduced soundings in a map of Holland, in 1585, and his contemporary, Lucas Janszon Waghenaer, the famous "Waggoner" of the British seamen of the sixteenth century, popularised this method in his numerous charts, since 1586. It is another Dutchman, Cruquius, to whom we owe the introduction of bathymetrical contours or fathom-lines, which first made their appearance in a chart of the Merwede, which he published in 1728. The meritorious French geographer Philip Buache adopted this method in his well-known chart of the English Channel, placed before the French Academy in 1737, although only published in 1757.

It was this same Buache who first suggested that elevations above the sea-level might be indicated according to the same method of contouring. Marcellin Ducarla of Vabres (b. 1738, d. 1816), revived this idea, and his friend Dupain-Triel of Paris (b. 1722, d. 1805), first acted upon it in 1791, when he published a map of France—"La France considérée dans les différents hauteurs de ses plaines"—which delineates the vertical configuration of the land by means of horizontal contours drawn at intervals of 60 feet. When Horsell, in 1835, tinted his contoured map of Norway and Sweden, according to height, all the features which distinguish the hypsographical maps of the present day had been introduced.

The next step in advance was taken by combining contoured hypso-

graphical maps with similar bathygraphical maps. This was done, as far as I am aware, by E. von Sydow, whose popular school-maps show the elevation of the land as also the depth of the sea by means of tints. Ziegler of Zurich, as early as 1856, published a "Hypsometric Atlas," which indicates ocean-depths, though still very crudely. Numerous maps of the same type have since been published by Dr. Berghaus, Keith Johnston, Kiepert, Petermann, and others, and at the present time not even an elementary atlas of physical geography is deemed complete unless it contains one or more maps of this class.

Cartographers, in effecting this combination of the "map" with the "chart," appear hitherto to have ignored the fact, that the heights on the one and the depths shown on the other, are not referred to the same datum level. The maps, consequently, with which they have presented us, give heights above an assumed mean level of the sea, whilst the depths, as taken from Admiralty charts, are referred to low water at ordinary spring-tides at the particular spot at which the soundings were taken. The foreshore, or at all events that portion of it which lies between low water and the mean water-level, is thus altogether ignored, and instead of a *combination* of Ordnance and Admiralty surveys, we are presented with a *juxtaposition* of Ordnance maps and Admiralty charts.

That this rough method is scientifically inadmissible is obvious. True, where the land borders upon a sea exhibiting no tidal oscillations, or where the scale of a map is small and the vertical interval between the horizontal contours proportionately considerable, this does not seriously, if at all, affect the correctness of the delineation. But when the maps are drawn on a large scale, we must not lose sight of the fact that the difference between the low and mean water-levels is frequently of considerable amount. Around the British Islands, for instance, the spring rise of the tides varies between four and 40 feet, the average being about 12 feet.*

It is obvious that in any delineation of the surface configuration of the solid surface of our earth by means of horizontal contours, these contours ought to be referred to the same datum-level. In other words, we must represent the sculptured surface of the earth's crust as if the sea had retired and the whole of its bed had become exposed to view. The principal contour would then encompass a datum-plane which might conveniently be taken to be identical with the mean water-level at some particular spot, whilst all other contours would be laid down on planes parallel with it.

The preparation of a map on this principle would appear to be simple enough, and only when we approach our task with a view of practically carrying out the method here suggested do we begin to realise the difficulties which it presents.

* See the accompanying sketch-map, based upon Commander H. Harris's 'Tide Tables,' 1884.

Our first task should be the selection of a datum-level. We are no longer able to accept as such what is called the mean level of the sea; for this mean level is by no means conformable to the surface of an ellipsoid of rotation. Theoretical considerations no less than actual measurements prove this. We may still speak of the mean level of the sea with reference to any particular locality, and can determine this level by means of tidal observations carried on during a sufficient period, but it is no longer permissible to speak of the mean level of the sea at large as an available datum-plane to which elevations or depressions may be reduced.

This is not an occasion for discussing the causes which affect the mean level of the sea, but I may be permitted to place before you the results of several of the more carefully conducted spirit-levellings in support of the assertion that there exist differences in the mean level of neighbouring seas.

The Mediterranean, as might have been expected from its greater salinity and the increased density resulting therefrom, is found by eight independent lines of spirit-levelling to be at a lower level than the Atlantic. Some of the results are as follows *:—

Lines of Spirit-levelling.	Mediterranean below the Atlantic or North Sea.
Amsterdam and Trieste	1·94 feet.
Amsterdam and Marseille	2·69 „
Brest and Marseille	5·315 „
Bayonne and Bouc (Rhône mouth)	2·709 „
Santander and Alicante	2·986 „

The mean level of the Baltic, as ascertained by careful observations carried on between 1846 and 1875 at fourteen stations, is 1·64 feet higher at Memel than it is on the coast of Holstein.†

The spirit-levellings conducted by the officers of the Ordnance Survey, and discussed by Colonel A. Ross Clarke, R.E.,‡ tend in the same direction, for they show that the sea surrounding the British Islands does not stand at a uniform level. By connecting the mean level of the sea at Liverpool by means of lines of spirit-levellings with the mean level of the sea at other points of the coast, it was found that there existed measurable if not very considerable differences. In Ireland, where 22 stations at which the mean level of the sea had been determined by tidal observations were connected by lines of spirit-levelling, similar results were obtained. The extreme difference of level was thus found to exist

* 'C. R. des séances de la com. perm. de l'Association géodesique internationale,' La Hague, 1882; 'Nivellement der trigon. Abtheilung der preuss. Landesaufnahme, V.'; Bourdeloue, 'Niv. de la France,' 1864.

† Hagen in 'Monatsberichte Berlin Academy,' 1877.

‡ 'Abstracts of the principal lines of Spirit-levelling in Ireland, England and Wales, and in Scotland,' 1855, 1861; 'Account of the principal Triangulation of Scotland,' 1858.

between Rispond, on the northern coast of Sutherlandshire, and Kilbaha, at the mouth of the Shannon. At Rispond the mean level is 1·736 feet above the mean level at Liverpool, at Kilbaha it is 1·442 feet below it; the extreme difference thus amounting to 3·178 feet.

I have attempted to illustrate the results obtained as to the level of the British seas by means of a little map. These results, however, are merely preliminary, for although we may accept the spirit-levellings as absolutely free from appreciable error, as errors arising from variations of gravity may be supposed to balance each other, the tidal observations were hardly in a single instance carried on during a sufficient period for obtaining the true mean level of the sea, and vulgar means were in many instances accepted for want of true means furnished by self-registering tide-gauges.*

Still, these observations, defective as they undoubtedly are, appear to portray the leading features of the case, and reasons why the sea should be piled up in some localities, while it is depressed in others, at once suggest themselves. That winds, currents, the horizontal configuration of the land, and the depth of the sea are more potent factors than bold coasts or proximity to lofty mountain ranges becomes at once apparent.

These differences are of sufficient magnitude to prevent our accepting the mean sea-level at large as a datum of reduction when dealing with surveys and levellings of the minute accuracy now aimed at, and really attained, in most countries of Europe. This would not, however, prevent our accepting the mean level of the sea at any particular spot for a datum-level to which altitudes as well as depths might be referred, unless, indeed, we should accept the surface of a spheroid determined by Captain Clarke as most nearly representing the surface of the British seas.

In Central Europe the zero-mark of the tide-gauge at Amsterdam (which is 0·4623 feet above the mean level of the sea) has been generally accepted as a datum-level, and I see no reason why the datum-level of the Ordnance Survey of Great Britain should not find acceptance for the whole of the British Islands.

The altitudes inserted upon the Ordnance maps of Great Britain are reduced to an assumed mean sea-level at Liverpool, which is 0·068 feet above the true level, as recorded by a self-registering tidal gauge placed against St. George's Pier. In the Ordnance maps of Ireland, on the other hand, all altitudes are referred to low water at spring tide, as observed at Poolbeg Lighthouse on April 8th, 1837. In order to reduce the altitudes on the Ordnance map of Ireland to the Liverpool datum-

* Mean level of the sea at Fleetwood above true mean level at Liverpool, according to Ordnance Survey (three months observations) 0·563 feet; according to Admiralty observations (nine months) 1·506 feet. At Liverpool the difference between the true mean and a vulgar mean, derived from maximum and minimum records, amounts to 0·366 feet.

level, they must be increased by 8 feet, as shown by trigonometrical measurements.

Having once adopted the datum-level of the Ordnance Survey there can arise no difficulty in giving a hypsographical delineation of the land-surfaces. The Ordnance Survey furnishes nearly all the materials that are wanted. Only in one respect will it be found to be deficient, viz. in data as to depressions covered with water, such as lake- and river-beds. Supplementary surveys will in most instances be required with reference to them, and we conceive that the results should be reduced to the accepted datum-level, instead of being referred to a variable water-surface.

We shall next have to consider the utilisation of Admiralty charts in the production of bathy-hypsographical maps. We have seen that the errors likely to arise from a disregard of differences in the mean level of the sea at different localities are but trifling in amount. On a map drawn on a small scale they would not show at all, and wherever the depth of the sea is considerable, they could not be ascertained by our present methods of surveying, as soundings taken from a boat cannot be expected to yield results equal in precision to those of a spirit-level. Incomparably far more considerable are the tidal movements of the ocean, having a range of between four and 40 feet along different parts of our coast.

Our Admiralty charts are primarily designed for the use of seamen, and the soundings which they give are naturally referred to low water at ordinary spring tides. This low water is the "datum for reduction," and as the spring rise, or main spring range, varies even within short distances, this "datum for reduction" is by no means a "datum-level" but represents in reality an inclined plane. In the British Channel, for instance, the spring rise varies between 23 and 40 feet, and consequently the mean level of the sea differs from the "datum of reduction" adopted by the Admiralty surveyors to the extent of from 12 to 20 feet. It is quite clear that quantities like these cannot be disregarded if we desire to delineate the bed of this channel by means of horizontal contour-lines confining planes equidistant from the plane representing the assumed mean sea-level, or with the "datum-plane" of the Ordnance Survey. In some of the sea lochs of Scotland, where the sea has a depth of hundreds of feet almost with a stone's throw from the land, and where the range of the tides is as a rule circumscribed, these differences would not show very conspicuously on a map, and still less so out at sea, where the tidal oscillations, proportionately to the depth of the ocean, are hardly appreciable. On the other hand, where the depth of the sea increases gradually, the tidal range becomes a very important factor, and in order to exhibit at a glance the difference between the contours as universally laid down on charts (with low water as the datum for reduction), and the contours on a bathygraphical map constructed in accordance with my suggestions,

I have prepared two diagrams designed to illustrate the surface features of the sea-bottom along that part of the south coast of England which extends from Selsea Bill to Brighton. Along that coast the difference between low water and the mean water-level varies, according to locality, between eight and 10 feet, and we may assume that this difference grows less as we depart from the land, until about 12 miles out at sea it is reduced to six feet.

The upper diagram has inserted upon it the contours or "fathom-lines," as they appear upon the published Admiralty chart. On the lower diagram I have inserted the same contours, taking the datum-level of the Ordnance Survey as the datum for reduction. A comparison of the two will show very appreciable differences. There are no doubt many parts along our coasts where these differences would be less, but elsewhere, as in the Bristol Channel, the Humber, or the Scottish firths, they would be far greater. At all events, it is clear that though we may neglect the ascertained differences in the mean level of the sea without seriously impairing the correctness of our delineation of the sculptured surface of the sea-bottom, we cannot neglect taking a careful account of the tidal range.

These, then, are the principal points to be considered in the preparation of bathy-hypsographical maps.

As to the materials available for such a map of the British Islands and of the surrounding seas, they include, as a matter of course, the Ordnance and Admiralty Surveys. The former, as soon as they shall be completed, will enable us to prepare a hypsographical map with a fulness and accuracy of detail certainly not to be surpassed in the case of any other country of equal extent. Supplementary surveys will no doubt be required if we desire to present also the features of lake- and river-beds, but some of these have already been made by local bodies or authorities, whilst others are in progress. The Admiralty Surveys furnish us with charts of nearly the whole of the surrounding seas on a scale of a least one mile to the inch. It is only when we proceed to a combination of the Ordnance and Admiralty Surveys, and even then only when it is desired to produce a map on a large scale, that the necessity of some further surveys makes itself felt. It is necessary, above all things, to devise a system of tidal observations which would accurately determine the relations between the Ordnance datum-level, the mean level of the sea, and low water. Observations of this kind would have to be carried on for five years if thoroughly trustworthy results are aimed at, and they ought to be made simultaneously at the largest possible number of stations. But once engaged upon work of this kind, the desirability of extending it and developing it into a complete survey of the British seas forces itself upon our attention. Surveys of this kind have been carried on with considerable success under the auspices of the Governments of Austria, Germany, Denmark, France,

and the United States, and it surely behoves the leading maritime nation of the world to take the lead in a work of this kind, and to carry to a satisfactory completion the labours so successfully begun in 1860 by the *Bulldog*, and since continued in the *Porcupine*, the *Lightning*, the *Valorous*, the *Knight Errant*, and the *Triton*. A "Survey of the British Seas," conducted by a Committee of the British Association, would most certainly yield valuable results in many departments of science.

But although I consider that further surveys are required before a combination of the Ordnance maps and Admiralty charts can be effected in a thoroughly satisfactory manner, I nevertheless believe that some useful cartographical work could be done even now. I more especially refer to the production of a general map on a scale of say 1 : 200,000, and of large-scale maps of certain estuaries and of other localities for which detailed surveys, quite sufficient for the purpose, are already available. The leading features of bathy-hypsographical maps, such as I suggest, would be as follows:—

1. All heights and depths would be referred to one and the same datum-level, altitudes being printed in Roman characters, depths in Stump.

2. The features of the ground would be shown by means of horizontal contours, which would enable the compiler to limit himself to the introduction of a comparatively small number of carefully selected figures.

3. The intervals between the contours would be tinted to bring out the relief of the ground.

4. The line along which land and water meet at ordinary spring tides would be clearly marked.

5. The foreshore and all sandbanks which uncover would be clearly indicated as on ordinary Admiralty charts.

6. The spring rise of the tide would be given as in Admiralty charts.

7. Roads, railways, and other features calculated to obscure the physical features of the ground would be omitted.

It need hardly be pointed out that a physical outline map of this character could be easily utilised for illustrating the hydrographical, the geological, and other features of the country.

Letters from Colonel Prejevalsky.

THE following has been received from St. Petersburg since the issue of our December No., in which, at p. 807, we published Colonel Prejevalsky's letter of the 10th of August:—

OASIS OF CHIRA, *August 10th*, 1885.

The impossibility, according to the information we had collected, of penetrating into Tibet with camels, and the extreme exhaustion of our beasts which had brought heavy packs on their backs all the way from Urga, compelled me to hire in Keria thirty packhorses for our intended excursion to the Tibetan plateau. We left our spare baggage (i. e. our collections) in care of the native governor (Khakim), and the camels, fifty-one in number, under guard of six Cossacks on some pastures not far from Keria, whilst we, fifteen all told, marched southwards in light array, hoping to enter Tibet by the same pass through which the Pundit travelled from Ladák in 1871. But, alas! we were doomed to disappointment. The said pass or ravine, through which flows the river Kurab, is, without taking into account the destruction of the bridges and paths by the Chinese, quite impassable for packhorses, particularly in summer, when all the mountain streams are full of water; and as there was no other pass, the visit to the north-west portion of Tibet had perforce to be abandoned and the mountains near Keria explored instead. The latter constitute the immediate continuation of the Russian range, and, like it, have no general appellation amongst the natives, who distinguish by name merely individual ravines and a few peaks. It was once more necessary, therefore, to officiate as godfather to the mountains we were exploring, and I named them the Kerian (Keriiski).

This range stretches 160 versts (107 miles) from east to west between the rivers Keria and Yurun-Kash, the latter dividing it from the mountains which continue the chain westward to the Karakorum. The Kerian range appears as a lofty, steep, disrupted wall of mountains, surpassing the snow-line throughout its extent. The snow-peaks even form a sierra on the outer border of the loftiest part of the range, and generally speaking the snowy region is here very extensive. We did not however perceive any exceptionally high single peaks, though, in places, above the general snowy mass rise still loftier groups at an absolute height probably of more than 20,000 feet. Unfortunately we were unable to measure these peaks trigonometrically, nor could we determine by the barometer the height of the snow-line; both one and the other being prevented by constant heavy rains, which fell twenty-five days running, i.e. the whole time of our stay in the lofty belt of the Kerian Mountains. These rains are undoubtedly brought here by the monsoons of the Indian Ocean, and continue during the three summer months, being heaviest in July. They account sufficiently for the profusion of glaciers, whence flow the many small rivers, on which, lower down, are situated the oases. It is thanks, too, to these summer rains that the belt on the slope of this range, at from 9000 to 12,000 feet absolute height, is covered with excellent pasturage, on which feed numerous flocks of fine-woolled sheep. The rainy region lessens, however, as you go northwards, so that in all probability only slight remnants of these rains reach the ridges of the Central Kuen-luen.

In spite of an abundance of water in summer, the flora and fauna of the Kerian range is very poor in species. There are no forests nor underwood of any kind. Large quadrupeds also are almost entirely wanting, if we except the mountain sheep, Kuku-Yaman (*Ovis Burrhel*), on the rocks; whilst of birds only griffon vultures and *oulars* are plentiful. The reason of this poverty of organic life is to be sought, perhaps, in the sharp contrast presented within a comparatively small space between the arid desert and the cold mountain range; and also in the great abruptness of

the mountain wall upon which as you rise even narrow belts differ greatly in regard to temperature and moisture.

The lower limit of glaciers on the northern slope of the Kerian range lies probably —to judge by analogy from the Sa-Glissousky Nan-Shan and the ridges of the plateau of Tibet—at an absolute height of 15,500 to 16,000 feet. On the southern slope, which is undoubtedly shorter, and perhaps topographically less rugged in character, the snow-line lies probably 500 or 1000 feet higher.

During our stay amidst the Kerian mountains we became pretty well acquainted with the southern Machinians, who inhabit them; and also studied to some extent another small but very interesting tribe, Polu.

The Polu village, consisting of fifty houses, all told, lies at an absolute height of 8000 feet, on the river Kurab, five versts before it falls into the river Keria. The affairs of the community are directed by an elected *aksakal*. The chief occupation of the inhabitants is agriculture, but partly also grazing. They are Mahommedans of the Sunnite sect. By descent they are Tibetans, and how they happened to find their way here is told in the following tradition:—

In Western Tibet it was once the custom to elect a Tsar, and after ten years' sovereignty put him to death, no matter whether he had governed well or ill.

One of the Tsars, Khatam by name, on the approach of his cruel fate, fled with 300 of his followers, and founded a small colony at the sources of the river Keria, and consequently on the plateau of Tibet. But the Mongols soon attacked the colony, ruined it, and destroyed the inhabitants. Only Khatam with his wife, son, and two relations escaped the massacre, and making their way down the river to beyond the mountains, mixed in marriage with the local Machinians, and founded the present settlement of Polu, which is inhabited already by the eighth generation of their descendants.

The people of Polu, like other natives of Eastern Turkistan, present in outward appearance a mixture of various types amongst which the Machinian predominates, though some few recall the Tibetans. Their dialect is also Machinian and retains, so the local elders say, hardly any Tibetan words. Manners, customs, and dress are the same as those of the Machinians.

With an account of the latter I shall take leave to close this letter.

The Machinians, already mentioned, consider themselves the aboriginal inhabitants of Eastern Turkistan, of which they now occupy the south-east portion, dwelling in the mountains as well as in the oases, and preserving their original type best in the former. In the oases, indeed, especially in the larger ones and in the towns, they have mingled partly with the Ardbul, partly with other immigrants of Eastern Turkistan. Their total number it is impossible to tell, but in the Keria oasis alone they are estimated at from 11–12,000 families.

The mountain Machinians, or as they call themselves Malcha, live on the Russian and Kerian ranges, and on the Karanga-tagh.*

In the Kerian mountains the Machinians (of the Keria district) number about 2000 families. They are chiefly occupied in grazing, and to a less extent, in agriculture. In appearance these purer blooded Machinians present a mixture of the Mongol and Aryan types, but with the latter strongly predominating. They have high cheek-bones, spreading nostrils, though not flattened as with the pure Mongols;

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* This name is applied to the mountainous region south of Keria. It seems to me that for the sake of geographical convenience the appellation Karanga-tagh might be extended to the whole snowy range which, in continuation of the Kerian Mountains, stretches from the river Yurun-Kash to the Karakorum, and thus constitutes the most westerly portion of the Kuen-luen.

there is little hair on the chin, and still less on the cheeks and lips; the eyes are large and not slanting; the skull is angular and flat at the back; the forehead also is generally flat; lips rather thick; stature small, or at most of middle height; figure not very strongly knit; skin dark, no lighter than that of the Mongols. Although the prevailing colour of eyes and hair is black, you meet often enough with men (as to the women I cannot speak) with blue or grey eyes and chestnut, sandy, or even red hair. In places, indeed, such specimens are even frequent.*

The men shave their heads and clip their moustachios, but let their whiskers and beards grow. Young girls wear from four to six plaits (two behind and two on the temples), according to the thickness of the hair. This way of dressing the hair is continued after marriage until pregnancy, after which women wear only the two plaits behind. Some, however, grow little curls on the temples, or cut a fringe on the forehead, just as our fashionable ladies do.

The type of the women amongst the mountain Machinians is not beautiful; but in the oases you come across pretty faces. The common clothing of both sexes is the *khalat* (dressing gown), which the men wear girdled and the women loose. Under the khalat are worn shirts and drawers. They wear boots like ours and sheepskin hats on their heads summer and winter. We did not see any turbans amongst the men of the mountain tribe, nor veils in special use amongst their women.

In the oases the Machinians dwell in *saklias* (cabins), built of clay; whilst in the mountains they excavate dwellings in the layers of loess clay. Such habitations are very convenient owing to their simplicity and cheapness of construction, and also because they are warm in winter and cool in summer.

The domestic arrangements and food of the Machinian mountaineer are as unattractive as his dwelling is simple. The food consists mainly of bread made of wheat, barley, or maize, which is eaten with milk in summer, and tea in winter. Meat they rarely use. In the oases the fare is better and more varied, the staple being fruit and vegetables, while tea and rice are more commonly in use. Mutton is sold in the bazaars for the preparation of their favourite dish, *pilau*, besides which they make *pilméns* † and different kinds of soup; and consume a good many fowls and ducks and their eggs. The food is cleanly cooked and the kitchen utensils are kept in good order.

The chief occupation, as already stated, of the mountain Machinians is grazing, mostly sheep, of which there are two kinds—one with coarse wool called *kilchak*, the other, fine-woolled, *ghirdé*. The first prevails on the Russian, the second on the Kerian range. They furnish excellent furs. Besides these the Machinians keep goats which supply them with very fine hair. Horned cattle are scarce, having died off to a great extent of late years. Asses are plentiful everywhere; they serve as pack animals and for riding. The horses are of fairly good breed, though not large; but they are few in number since the Chinese destroyed them some years ago, in fear of a native rising.‡ This massacre was carried out, we were told, in the most barbarous manner; for the Chinese led the horses away and, instead of killing them outright, froze them to death either by driving them into the rivers in winter or by pouring water over them during a frost. In this way perished thousands of these useful animals which were already sufficiently scarce in Eastern Turkistan.

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* A very important fact. Are not these Machinians perhaps the direct descendants of those blue-eyed sandy-haired inhabitants of Eastern Turkistan, who dwelt there, according to Chinese MSS., under the name of Saks and Goths even before our era?

† *Pilméns* are little dough patties, unbaked, filled with minced meat and herbs. They are eaten hot in great quantities all over Central Asia.—M.

‡ I was told this in Central Asia in 1880.—M.

The most striking characteristic of the Machinians is their terrible loquacity, in which the men even surpass the women. Besides this, they are great cowards and holiday-makers. Their favourite diversion is afforded by singing, music, and dancing, even in the wildest clefts of the mountains.

"It's lucky these people don't know *vodka* (corn brandy), or they'd go wrong altogether," said our Cossacks, shrewdly characterising the festive inclinations of the Machinians; who, moreover, are avaricious and much given to idleness and (like all Asiatics) debauchery. On the other hand, a praiseworthy feature of their character is their love of children and affection towards their relations, each one in time of need helping the other. Parents and elders, too, are much respected. Thieving, in the mountains at least, is a crime of rare occurrence. It cannot be said that the mountaineers are a feeble race, yet the women in general are more vigorous than the men, and also more industrious. On them lies the whole care of the house and the bringing up of the children, who are suckled at the breast up to two and even three years of age, when they already walk and talk with ease. As a rule, the Machinians have only one wife each, but sometimes two or three. They change them, however, pretty often, divorce being very easy. Not unfrequently you may meet a woman who has married a sixth or seventh husband, whilst there is hardly one but has had two or three. They marry young, at from twelve to thirteen years for the women, and fifteen for the men. Divorced couples can marry again on the morrow. Kinship, even in the second degree, is no impediment to marriage; so that an uncle may marry his niece or a nephew his aunt, to say nothing of cousins amongst themselves. Only the very nearest relations, own brother and sister, are unable to unite in matrimony. The marriage rites are those usual with Mussulmans; there is no great feasting on the occasion, so that the weddings are not costly. Funerals are also conducted in accordance with the usual Mussulman ceremonial, the only difference being that the near relations of the deceased have to live on his grave for forty days, an observance, however, which is only partially kept. Every Thursday people visit the tombs of their ancestors, pray to them, and beg their help in this life.* At the same time they leave food on the sepulchre, which is afterwards, as a rule, devoured by the poor.

All the Machinians are Sunnis, but by no means fanatical in the matter of religion. The language, even of the mountaineers, does not differ, or at most in a very insignificant degree, from that common to the whole of Eastern Turkistan. Thus our interpreter from Kuldja easily made himself understood wherever we went, though he stated that the Machinians occasionally used words unlike those of Kuldja.

Leaving the mountains of Keria, we struck the Khotan road in the Chira oasis in the beginning of August, and sent thence to Keria for the baggage and camels we had left there. They will reach us in a few days, and we shall then journey through Khotan by the river of that name to Aksu, and on across the Tian-Shan to our own borders, where we shall arrive in all probability towards the end of October.

Since the foregoing letter was received, later news has arrived to the effect that Colonel Prejevalsky had passed through Karakol, and might be expected in St. Petersburg in the beginning of January. He telegraphs that the expedition has been very successful, and that he brings home rich collections.

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* Here we find therefore the practice of ancestor-worship.

Notes of a Journey in Karateghin and Darwaz in 1882.

By M. Kossiakof, Military Topographer.* Translated from the Russian and annotated by E. Delmar Morgan.

Map, p. 64.†

I.—From Penjkend viâ Hissar to Kobadian.‡

The expedition of Dr. Regel to Shughnan, to which I was appointed in the quality of topographer, having completed its outfit, set out in the middle of June 1882 from the town of Penjkend. §

The road lay at first along the left bank of the Zarafshan over level ground well suited for arbas,‖ but at the sixth verst ¶ led to a sudden though well-contrived descent. At the ninth verst is the hamlet ** of Sudjan, situated on both banks of the river Maghian, here spanned by a bridge. One verst before reaching the hamlet of Guzar †† I met with a second descent as steep as the first and 1060 feet long. From Guzar to the hamlet of Kshtut for a distance of seven versts the road is level and passes through a cultivated valley, but soon after crosses a ravine 450 feet wide, and again enters the valley, passing on the right the hamlet of Sauran. From Varzikand, a hamlet at the ninth verst, the traveller ascends a small pass, and then turning in a south-easterly direction descends somewhat abruptly to the river Voru, along the left bank of which lies the road. Before reaching Kshtut, however, it recrosses to the right bank of the Voru, and about 500 yards farther enters a small defile. Both these passages of the river are bridged. It is only after descending the pass to the Voru that vegetation, such as the wild almond tree, the wild cherry, and the sweet-briar, is met with. The road from Varzikand to Kshtut is only fit for pack animals, carts may not pass that way. Kshtut lies on both banks of the Voru, and is surrounded by lofty mountains capped with snow. At this place the Voru receives two tributaries, the Karaibak on the right and the Busardagu on the left. Upon the upper waters of the last named is the hamlet of Paganà.

From Kshtut I proceeded to Lake Kul-i-Kalam by the right bank of the Karaibak, part of the way along the edge of a narrow ravine. Before reaching the hamlet of Panjirat the river is crossed and recrossed, the road lying occasionally

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* Translated from the *Isvestiga*, vol. xx., No. 6; for general map the reader is referred to Supplementary Papers R. G. S., vol. i. part 2.

† The map we give in the present No. is reproduced from the author's survey map accompanying the Russian article.

‡ This road is referred to in 'Journal R. G. S.,' vol. xliii. p. 271. It crosses a mountainous district, generally known under the name of Kohistan. Cf. Schuyler's 'Turkistan,' vol. i. p. 279.

§ Penjkend (Panjkent, lit. the five towns), in N. lat. 39° 35′, E. long. 67° 38′, according to Arrowsmith's map, is a town or fortress situate in the Zarafshan valley. It was formerly the capital of a bek-ship, till it was subjugated by Bokhara. When the Russians took Samarkand Penjkend declared itself independent, and afterwards voluntarily submitted to Russia. 'Journal R. G. S.,' vol. xl. p. 449.

‖ Arbas are the native high carts on two wheels in universal use in Turkistan.

¶ A verst is equal to 1166 English yards, or about two-thirds of a mile.

** We have rendered the native word *kishlak* by hamlet throughout the paper.

†† It is at the village of Guzar that there is a remarkable bridge across the Zarafshan, where the river cuts its way in two channels between precipitous walls of conglomerate. Cf. 'Journal R. G. S.,' vol. xl. p. 453.

along cornices, and now and again over cultivated land. At the seventh verst the Karaibak receives a tributary—the Artutch; at the ninth verst on the right bank of the last-named rivulet stands the hamlet of Madára, and a little beyond, that of Artutch. Two versts from here is a bridge, and the road after crossing it follows the right bank. For about 500 yards farther it lies along a grassy valley before ascending a steep mountain, perfectly easy, however, for horsemen. The scenery here is very picturesque; water falling from a height of 700 feet strikes the rocks with a noise so loud that it is difficult to hear any one speaking to you. At the ascent the road crosses to the right bank and continues along it for two versts as far as the confluence of the Turosh with the Karaibak, then it recrosses to the left bank by a bridge, and scales the mountain by a rugged though not very lofty ascent, becoming very steep for the last 500 yards. The nights are so cold here that as evening closed in we were glad to put on our fur *beshmets** and sleep under wadded quilts. The banks of the Karaibak and Turosh, particularly the latter, are covered with a most varied flora. We first came to apple trees, peach trees, *uriuk*,† but as we went higher the less frequent did they become, till at length their place was taken by the white, red, and yellow briar rose, the juniper, the nettle, and the guelder rose. A second ascent has to be made through a narrow valley for about 500 yards, then up the mountain. At the summit is a small pass which gives birth to two streamlets flowing into the Turosh. From this point a short and very narrow rocky descent leads to Lake Kul-i-Kalam,‡ which lies in a valley or hollow extending three to four versts from east to west and a little over one verst from north to south. All the lakes (two good-sized and deep, besides several smaller in this valley) are chiefly fed by the Cham-targa on the south-east and the Ruzi-ravat on the north-east. From the easternmost lake there is an outlet to that on the west, while another small watercourse flowing in a northerly direction is the beginning of the river Turosh. Lake Kul-i-Kalam is nearly 9800 feet above sea-level. On the south and south-east of it rise snowy ranges upwards of 12,000 feet high, and ice may be seen in some of their crevasses.

During the whole of my stay at Kul-i-Kalam a north-westerly wind prevailed, and on the 22nd and 23rd of June a little rain fell. There is only one road from this lake to the hamlet of Marguzar over the Ruz-i-ravat§ Pass (10,000 feet),‖ thinly coated with snow. The ascent to this pass, two versts long, is steep throughout, and the descent on the opposite side is equally long and steep but less rocky. It is accomplished by a series of zigzags leading to the left bank of the Sarga rivulet, which rises in the mountains encompassing the lake. To the right of Lake Kul-i-Kalam there is a deep depression filled with snow which will probably lie till a fresh

* The *beshmet* is a close-fitting tunic.

† *Uriuk* is the native name for a small peach, which is dried and sold in all the bazaars, and exported to Russia.

‡ Lake Kul-i-Kalam was mentioned but not seen by M. Lehmann, who confounds it with Lake Iskander-kul (as apparently does M. Fedchenko, who places his second lake, which he calls "Alauddin," at the source of the Kshtut river), the two being quite distinct, as our text shows. Cf. 'Journal R. G. S.,' vol. xl. p. 450.

§ This name looks as if it had something to do with the Russians (ravat or rabat signifying house), the whole name therefore meaning, house of the Russians. There is a village in the Zarafshan valley called *Uruss*, which is said to have derived its name from Russian deserters who settled in it centuries ago. Cf. Reclus, tom. vi. p. 537.

‖ There is some mistake here in the heights: that of the lake is given as 9800 feet, while the pass is represented to be 10,000 feet, or only 200 feet above the lake; the ascent, however, from the lake to the pass is described to be two versts long and steep throughout.

fall. In descending from the pass we found at the same elevation as the lake a temperature at night of 7°·6 Cels. [15° Fahr.], and in the early morning (3 A.M.) it was so cold that we had to warm hands and feet over the fire, a proof of the proximity of snow. Less than half-way up the pass all vegetation ceases, and only reappears at the descent, when an occasional poplar and juniper may be seen and the banks of the stream are covered with grass. On descending from the pass I rode for seven versts along the left bank of the Sarga, mostly along cornices, and a little way farther came to a small valley cultivated in many places and sown with rye. At the thirteenth verst the valley terminates and the road descends by zigzags. Here the river falls in cascades between steep banks and presents a beautiful picture. About one mile and a half farther the road again enters a small valley, from the end of which the river Surkhab* issues from the hills, and uniting with the Sarga, continues to flow under its former name. About 500 yards from their confluence we crossed to the right bank and descended among rocks to a natural stone bridge. This has been formed by the displacement of an overhanging crag, which in falling has blocked the river channel, yet so huge was it that it caught on either bank and left free space for the river to flow underneath. The hand of man completed nature's work, and thus produced a solid and serviceable bridge. From Lake Kul-i-Kalam on our right there rose a very beautiful snowy range. This is known near the lake by the name of *Gou-Khan*, but towards the Surkhab it bears that of *Bad-Khan* or "place of the winds," a literal translation of the somewhat poetical native name.

The inhabitants of these mountain hamlets are of Tadjik race, presenting a distinct and peculiar type, for among them an occasional fair complexion may be seen. Their occupation is chiefly husbandry, and they rarely follow a pastoral life. Their houses or huts are mostly built of rock, the interstices being filled with clay, but now and then unburnt bricks are used in their construction.

The hamlet of Marguzar lies on the left bank of the Surkhab, under the shelter of the mountain. A short distance below it the Uzgur rivulet falls into the Surkhab on the right, having its source in the snowy mountains in the vicinity. About 500 yards above its confluence with that river it falls from a perfectly precipitous ledge of rock 35 feet high, forming a pretty waterfall. At the junction of the Uzgur and Surkhab a bridge has been built; beyond it the valley closes and the waters of the river confined within banks rush with a terrible noise over the rocks beneath. The route from Kshtut to Marguzar may serve for pack animals, but is not everywhere suitable even for this purpose. From the confluence of the Sarga and Surkhab the mountains are rocky and but scantily clothed with vegetation. The juniper disappears altogether, and only along the banks of the Surkhab and the sloping sides of the valleys does one meet with bushes and an occasional birch tree.

From Marguzar the road crosses the last-mentioned bridge and ascends a rocky spur with a somewhat abrupt descent on the reverse side; it then enters a narrow valley sown with rye, barley, wheat, a few beans and peas. Three versts from Marguzar on the left bank of the Surkhab lies the hamlet of Pasrut, where there are no less than four bridges. By the third of these the road crosses to the left bank of the Surkhab, and at the end of the hamlet returns to the right bank, along which it runs for two versts. Before reaching the hamlet of Pinion, however, it again crosses to the left bank. Pinion is situated among rocky hills aligning the left bank of the Surkhab; north-east of it may be seen the hamlet of Fan, standing on a hill. From Pinion to Lake Iskander-kul the road follows the left bank of the Surkhab for a

* This river must not be confounded with its namesake, the well-known right affluent of the Upper Oxus.

distance of 2½ versts to its confluence with the Fan, near which are the ruins of the old fortress of Sardab.* Having crossed the Surkhab by a bridge, it takes a south-westerly direction along the left bank of the Fan, formed by the junction of the Yagnob † and the Iskander-daria. Near their confluence the last-mentioned stream is bridged. A road leads hence up the Yagnob to the pass of Utch-turgardan (Zigdi). Fifteen versts from Pinion and one verst from the right bank of the Iskander-daria lies the hamlet of Makshevat, a little way beyond is the hamlet of Kairanbit, at the sixteenth verst is Jijik, and three versts farther, Narvat. Here the road crosses to the right bank by a bridge, and after continuing along it 4½ versts recrosses to the left. A steep and difficult ascent has then to be accomplished, followed by a descent to the bank of the river which is never left to Iskander-kul. From Pinion the slopes are mostly stony and covered with inferior grasses. But from Jijik, and especially from Narvat, the banks of the Iskander-daria abound with various bushes and trees. Here may be seen the birch, the poplar, the willow, the guelder rose, the woodbine, the wild rose, the juniper, and others. From Pinion to Lake Iskander-kul the traveller may ride, but not without danger. At the third verst from the confluence of the Surkhab with the Fan we were obliged to take the saddlebags off our horses and carry them on our arms, for on one side was the cliff and on the other a frightful precipice with the river rushing below.

Lake Iskander-kul ‡ lies in the midst of mountains whose peaks are bare of vegetation, while their slopes are wooded with juniper and covered with grass. The lake is 7120 feet above sea-level and is 3 versts long by 1½ wide. On the north-west the little river Obi-saryma falls into it, having its source in the snowy mountains, and forming not far from its junction with the lake a lovely valley covered with rich grass and dense underwood of birch, willow, and poplar. In the north-eastern part of this valley there is a small lake, into which falls the Khazar-mysh flowing from the east and the Sary-tagh rivulet from the south. This, the largest of the three streams, forms at its confluence with the lake a valley about a mile in length and breadth. The banks of Iskander-kul and the other two rivers, particularly near their mouth, are covered with rich grass and bushes, among which are a few apple trees.

The road from Iskander-kul to the Mura Pass skirts the western shore of the lake, and then follows the Sary-tagh rivulet. About one mile from the lake is a very sudden and difficult ascent, followed by a descent into a valley, at the end of which a bridge has to be crossed to the right bank before the hamlet of Sary-tagh can be reached. The road then continues along the bank of this river for three versts before turning southward up the pass. The banks of the Sary-tagh from the hamlet are wooded and grassy. Half-way up, the road had been spoilt by the spring rains, though the surveyor of the commune had taken pains to repair it. The repairs had nevertheless been badly executed, and the work had evidently been hurriedly finished, for on one of the cornices damaged by the rains lay a loose piece of timber upon which stones and earth had been thrown. I rode first, behind me followed a Cossack and interpreter, each leading a pack-horse, while the guide walked behind. I,

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* Or Sarvad, visited by Lehmann the botanist: cf. 'Journal R. G. S.,' vol. xl. p. 450.

† The Yagnob or Yagnau-ab flows for the greater part of its course parallel with the Zarafshan, from which river however it is separated by the Zarafshan range. The Yagnau-ab rises in a glacier in about long. 69° 30′ E. Cf. Schuyler's 'Turkistan,' i. 277.

‡ M. Lehmann in 1841 passed within 17 miles of Lake Iskander-kul without knowing it. For a curious legend connecting this lake with Alexander the Great, see Schuyler, op. cit., pp. 277–8. An engraving of this lake, after a sketch by Madame Olga Fedchenko, may be seen in Reclus' 'Nouvelle Géographie Universelle,' tome vi. p. 396.

the Cossack, and interpreter crossed safely this improvised bridge, but the interpreter's pack-horse unwarily trod on the edge of the beam and in a moment fell headlong down. The poor animal rolled over and over like a wheel for more than 200 feet, and at length struck against a large rock which stopped it, but its pack was torn off and fell 140 feet lower. With great difficulty the injured horse was rescued, and with still greater efforts we saved the pack. I immediately hastened to warn Dr. Regel who rode behind, but his first horse had already stepped on the same piece of timber and shared a similar fate to that which had overtaken the steed of my interpreter, and the Doctor having decided to postpone the passage till morning, it being already dark, had returned to the lake. From the point where the road turns to the south, or strictly speaking from the confluence of the Khoshgofis with the Sary-tagh, we followed the right bank of the last-named stream. Two versts and a half farther, the Khoshgofis is joined by the Khosh-pishvar, which has its source at the pass, and the road continues along its left bank. The ascent of the Mura Pass is steep, and for two versts we had to walk through snow. There was no snow, however, at the pass itself, though in descending we came to some more. Having rounded a steep bluff and ridden one verst farther, I ascended a second pass, and descended by zigzags through deep snow for a distance of two versts. The descent was precipitous and very difficult. At the pass the river Khosh-assan takes its rise invisible at first beneath the snow, but clearly coming in view at the third verst in a steep part of the descent. At the fifth verst a snow bridge has to be crossed, and the road henceforward lies along the right bank over rocks. At the eighth verst the Khosh-assan is joined on the right by the Dikhan-daria. Here juniper and various herbaceous plants make their appearance, but the grass is unsuitable for horses. At the confluence of the Dikhan-daria with the Khosh-assan, which here takes the name of Khakimi, the road crosses by a bridge to the left bank of the last-named river, and is carried along a stony mountain slope, partly supported on wooden props, a very difficult and perilous part of the journey. The northern slopes of the mountains as far as the Mura Pass are mostly limestone and slate; granite also occurs, and its débris covers the whole road. Vegetation is luxuriant. Here may be seen the nut, the maple, the apple, the willow, the ash, the honeysuckle, and several others. Higher up, the juniper, the maple, and the nut, are the prevailing kinds. At the second verst from the pass the Khakimi receives a left tributary, the Yaichin, and at the fifth verst the Temir-daria on the right. Bridges are frequent as the road crosses from bank to bank of the Khakimi, which receives two more left affluents, the Parian and Ak-tash. Twenty versts from the Mura Pass lies the hamlet of Khakimi on the right bank of the river, containing twenty clay-built houses inhabited by Tadjiks, who are chiefly engaged in agriculture.

The Kara-tagh Mountains are 23 versts from the village of Khakimi, whence the road lies along the right bank of the river and afterwards enters a rocky defile eight versts long. Two versts beyond, the Khakimi is joined by the Sarbin, and at the fifth verst the road crosses to the left bank, and after following this for about two versts, recrosses to the right bank, along which it continues to the hamlet of Liabijai, entering a small valley, the right side of which is cultivated and the left wooded with willow. Liabijai lies on the right bank of the Khakimi, on a low spur of the range. The mountains here are less rugged and rocky, most of their slopes being either cultivated or wooded. From this point the road is much better. Opposite Liabijai it crosses to the left bank of the Khakimi, and after following this for some distance, recrosses to the right bank, on which is situated the hamlet of Abdu. Between this and Kara-tagh there are three hamlets: Kuran on the right bank, Pushtijan and Sari-pul on the left. From the last-named there are no villages, only solitary huts to Kara-tagh.

The town of Kara-tagh lies on both banks of the Khakimi. The bazaar and most of the buildings, which are said to number 700, are on the left bank, while the fortress, or more correctly the former residence of the once independent beks, stands on the right bank. At present the fortress and buildings inside it are in a dilapidated state and uninhabited, the present bek preferring to live in the town. Kara-tagh is famed for its cutlery,* but the people are mostly agriculturists, as the slopes of the neighbouring hills testify. Corn grows here without artificial irrigation, a circumstance greatly in favour of the agriculturist; and we met with but few irrigating dykes, and these only close to the villages.

At Kara-tagh the Khakimi changes its name for that of the town, which it continues to bear as it flows southward till it is joined by the Ak-jar, which rises in the snowy mountains on the north-west.

From Kara-tagh to Hissar the distance by road is 24 versts, the direction generally south-east. Crossing to the left bank of the river in the town near the bazaar, we continued to follow this bank, passing Kalta-juvar at the third verst and Shur-ab at the sixth verst. A little way farther a road branches off to the left, leading direct to Dushambe. At the ninth verst we crossed by a bridge the Kalta-juvar dyke, and at the tenth came to the hamlet of Chuji. At Katerma on the 13th verst the road is crossed by another leading from the town of Denau to Dushambe. After passing several small irrigating dykes and fording the Changa-ab or Khan-i-keh-daria, we reached Hissar, having found the road good and suitable for wheeled traffic the whole way from Kara-tagh.

The town of Hissar† is surrounded by a small clay wall ruined in many places, and contains a large fortress built on a high hill. Its walls are also of clay, some 30 feet high, of no great thickness, while high towers built of burnt bricks guard the gates, but there is no moat. Inside is the large palace of Bek Jan, which he occupies only in winter, as in the summer he retreats to Kara-tagh.

From Hissar to Kobadian the distance is 115 versts (77 miles). The road takes a south-westerly direction along the right bank of the Kafirnahan‡ and may be traversed by cavalry and infantry; with a few repairs artillery might even pass that way. Six versts from Hissar is the hamlet of Khanchi, astride on both banks of the river, which is crossed by the people on inflated skins (*tursuki*), for there are neither bridges nor fords here. At the 20th verst lies Khatch-gardab, and at the 23rd, on the right bank, the salt mines of Khanchi; at the 29th verst are the ruins of Turakh, and at the 48th the wintering station of Ak-Mechet. The names of the other hamlets along this part of the route are Sokhta, Jartiva, Karanga-kul, and Tarpayak. From Ak-Mechet there is a road across the mountains to Denau, but this is not particularly good if the inhabitants are to be believed. From Hissar to Ak-Mechet the road lies the whole way by the right bank of the Kafirnahan, along a valley varying in width from 700 yards to 1¼ mile, and is frequently intersected by ravines formed by the spring and summer rains. At the eighth verst beyond Ak-Mechet the road leaves the river and takes a south-westerly direction over undulating ground much cut up by ravines. At the 17th verst it turns to the south-east and follows a ravine to the river, along the bank

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* This is also the case with Hissar: cf. Reclus, p. 500.

† Hissar, in the time of Hwen Thsang, the Buddhist monk traveller, formed part of the empire of the Ephthalites or White Huns, whom he calls the *Tukhara*, and its district was known under the name of *Chaganian*, modified by the Arabs into *Shaganian*. After the rise of the Uzbek power, this region of Tukharistan was split up into a number of petty bekships, Hissar, owing to its strong position, being the principal. It was here that the Emperor Baber took refuge after his defeat near Bokhara in 1512 A.D.

‡ I.e. cave of infidels.

of which it continues. At the 95th verst is a nomad camping-ground and burial place bearing the name of Tart-ku. At the 107th verst is the hamlet Bash-charvak, where there is a ferry, a small canoe being kept here for this purpose; horses have to swim the river, which is 140 feet wide here, with a rapid current. Two versts from the ferry is the hamlet of Chaparek, on a dyke which leaves the river one verst from the ferry, and supplies the town of Kobadian with water. All the inhabitants of the valley of the Kafirnahan are of either Turkish or Tajik race; they are mostly engaged in pastoral pursuits, for which this district, abounding as it does in excellent grazing grounds, is very favourable. Between Hissar and Turakh the mountains on the left bear the name of Kui-Karchi, on the right, Baba-tagh. Farther on the left a second and much higher range is known as Khodja-bakan, while on the right are the Hazret-baba mountains. At Kobadian itself the mountains on the right are called Khodja-gaziman, after a Mahommedan saint who once lived here, and tradition says was slain by a Kafir, those on the right—Kaiki. Near Kobadian the river Kafirnahan divides into two branches, both of which are some little distance from the river. Besides these two principal arms of the river, smaller channels separate from the easternmost arm and form islands covered with cane brake and bushes, the haunt of tigers and pheasants, as the bek informed us. The environs of Kobadian are infested by jackals, which make a horrible noise by night, and the bek keeps people to drive them away.

Kobadian stands on the left bank of the Kafirnahan, two versts from the bifurcation of its channel. On the north-east and south it is environed by a clay wall about 10 feet high and 4 feet thick at the foundation. In the centre of the town is the fortress occupying an area 560 feet square, built on a low hill, with walls 30 to 50 feet high. The palace of the bek is within this fortress, adjoining on its eastern side the remains of an older fort, of which hardly anything is left, its site being now occupied by the bek's garden and clover field. The streets of Kobadian are narrow; there are no carts, horses and mules being chiefly employed for transport. Besides these, wooden sleighs not unlike our own (Russian) are used.

II.—From Kobadian, viâ Kulab, to Fort Kala-i-Khumb in Darwaz.

From the town of Kobadian to the town of Kurgan-tiube the distance is about 76 versts. The road at first goes to the north-east, and at the third verst intersects a stony valley, along the right side of which it passes, for 3½ versts. After crossing a small col, it again enters a defile and runs along it for four versts. At the tenth verst the ground is almost level, and bears the name of Ishak-rabat,* where remains of buildings may be seen. Four versts further, a hill has to be ascended; on the left is a deep ravine, along the edge of which lies the road, which at the seventeenth verst descends into it and follows along the bottom or by the right flank. At the twenty-second verst, having surmounted the ascent and crossed a small pass, the traveller enters the valley of the Vaksh by a steep descent cut into the rocks. The road from Kobadian to the Vaksh is good throughout, except in the first defile of the last descent, where artillery cannot pass. It then runs east for about five versts to the ferry, at first by a grassy valley, and afterwards through thickets and canebrake. The ferry is near the Turkoman hamlet of Jili-kul, and has only a small kayuk or boat in which men and baggage are taken across, while horses have to swim. The breadth of the Vaksh at the ferry is 700 feet, but in other places it is more than four times as wide. From Jili-kul the road runs north-east along the left bank of the Vaksh, over a plain country at a distance of about two versts or more from the river. At the fifth verst from the hamlet, the ruins of fort Afganchi are passed; at

* I.e. Asses' caravanserai.

the fifteenth, to the right of the road, is the Turkoman encampment of Tobili Lekhman, and at the eighteenth verst the winter settlement of Mullah-Rakhman. At the nineteenth and twenty-first verst, two hamlets bearing the name of Lekhman are situate, whilst to the left on the river bank are the ruins of a fort and an encampment of the same name, and one verst higher up the hamlet of Jugalan. At the twenty-second verst, not far from the road, is the hamlet of Kizil-tushuk, and a place to the north of it, called Urtaburg. At the twenty-third verst the road crosses an irrigating dyke by a ford, and ascends to a small defile; it then follows a tableland for 4½ versts, and then again descends to the valley. At the twenty-ninth verst it crosses an old irrigating dyke, lying north-west and south-east. At the thirty-first verst, it recrosses it. At the thirty-third, another dyke has to be forded, after which the road lies along its right bank to the hamlet of Abdrakhman, which stands on the left bank of the dyke, five versts from the town of Kurghan-tiube. Beyond the hamlet, the road crosses a bridge to the left of the dyke, which it follows to the town. From Jili-kul to Kurgan-tiube the road is fairly good, even for arbas, there is sufficient forage, and in the valley of the Vaksh, fuel. The inhabitants are mostly Turkomans, who migrated hither about seven years ago.

The town of Kurgan-tiube is situate near the left bank of the river Vaksh, two versts from it, on an irrigating canal led from the river. It is a small town with a fortress, built on a hillock about 70 feet high, occupying an area about 700 feet long by 280 feet wide. There is no moat, but the walls are 35 feet high and 5½ feet wide at the foundation. Inside the fortress, on the northern side, are the remains of an old dilapidated wall, the residence of the bek and his retainers. The road skirts the fortress separating it from the bek's garden on the east side. Kurgan-tiube has a small bazaar, and a very insignificant trade.

From Kurgan-tiube to Kulab, viâ Tash-robat, the distance is 106 versts. The direction of the road is south-east along a level, cultivated valley. At the fourth verst it crosses a dyke, on which to the right of the road is the hamlet of Ilta, and on the left the ruins of an old fort. At the seventh verst, to the right and left of the road, stands the hamlet of Charbul-tiube, and five versts to the south of it, that of Hodja-bulgun. At the ninth verst the road crosses a dry ravine, and a little way beyond ascends by a defile to a smooth tableland, not irrigated. By this it continues for five versts and then crosses a small pass, beyond which it lies chiefly through ravines over undulating ground to Tash-robat spring. The water here is brackish, but is nevertheless used by the nomads for preparing their food, and for drinking purposes. The road now follows the left bank of the spring for two versts before ascending the stony but not steep Tash-robat pass. At the ascent on the left side, it is said, are the ruins of an old fortress, but this was apparently a stone building which served for an outpost. The whole range on either side is covered with pistachio trees. The descent is neither steep nor stony. Six versts from the pass to the left of the road, in a deep glen, is a well, but the water is too salt for horses to drink. Beyond it, the road lies through and along the edges of glens, the mountains are not high, and their slopes are fissured by ravines; one ridge, however, stands out more boldly than the rest, with some ruins, and a pass over it bearing the name of Terekli, from the pistachio trees covering it, while the other hills are covered with grass. At the sixtieth verst a road branches off the Kulab road leading to Baljuan, and this, according to the guides, is easy of passage, but waterless. At the second verst a brackish brook is crossed, flowing from north to south, its source being two versts from the road; the water, though unfit for human beings, is drunk by horses. 700 feet to the left of the road are some salt mines, almost neglected, owing to the fact of there being other nearer Kulab containing salt of a better quality. The road here ascends the mountain in a slanting direction, and then

follows some shallow glens. Two versts farther is a small pass, whence the road descends by a gradual incline at first, then by a ravine. At the seventy-fifth verst it crosses a glen of no great depth, then ascends a small ridge and descends into the valley of the Kichi-Surkhab* to the hamlet of Khul-bakh situate on the right bank of this river.

From Khul-bakh three roads diverge, one northwards to Baljuan, a second south to Yangi-kala,† which lies on the left bank of the Panj, and the third to Kulab. That to Kulab from Khul-bakh runs west, and at the second verst crosses the Kichi-Surkhab by a ford, for the water here is not high. At the fourth verst the road approaches a mountain, and lies along its foot for rather over a verst before ascending to high tableland in a north-easterly direction, and then descending into the valley of the Ak-su. Having forded this river, it follows the left bank for about two versts through small scrub. At the first verst it crosses a second arm, and leads through the hamlet of Kaptar-khan to Kulab, only five versts off. Here the ground is at first marshy and reed-covered, and two more arms of the Ak-su have to be crossed, both shallow, and the last flowing past Kulab.

The town of Kul-ab‡ (i. e. lake-water) is situate on the left bank of the river Ak-su, on a flat-topped hill. It is fairly populous, and has more trade than Kobadian and Kurgan-tiube. Its fortress is in the southern part of the town, and is 420 feet long by 280 wide. Its walls are of clay, four arshines (9 feet) high by one (2 feet) thick. Inside are unoccupied buildings, and the place itself is out of repair, the bek residing in the town.

The whole way from Kurgan-tiube to Khul-bakh is at present suitable for baggage animals, but there is every indication of its having lately served for wheeled traffic. Between Hodja-bulghun and the foot of the mountains, and to the north and south of this hamlet, as far even as Tash-robat brook, Kirghiz nomadise, having removed hither from the Turkistan district.

The road from Kul-ab runs north, at first over high level ground for about two versts, and then descends to the valley of the Ak-su, keeping the same direction. At the end of the third verst, to the left of the road, are two hamlets on either side of a desiccated arm of the Ak-su; that on the right bank is Mullah-sultani, that on the left, Koreh. At the fifth verst, to the left of the road, lies the hamlet of Oftablik, at the eighth verst Zerekli, at the ninth Hodja-isok, at the tenth Jar-kala, at the thirteenth and fourteenth Dagáná. On the right bank of the valley of the Ak-su are four hamlets, the southernmost of these is Imam-taristi, the other three are named Pushan. From Dagana the road turns east, and preserves this direction for four versts; it then turns to north-east, and follows a ravine which takes the name of Hodja-inur, from a hamlet situate to the north of it, watered by a small brook. Passing along this brook for 2½ versts, the road again turns to the east, and ascends by the glen to a small pass. From the summit, the traveller sees before him the beautiful Muminabad valley, forming a distinct canton, ruled by an *amliakdar*, and comprising twenty hamlets. From the summit, the traveller, after taking an easterly direction, for 1½ versts, turns to the north-east, and after crossing a small col descends into the valley near the hamlet of Muminabad. All the hamlets in this valley stand on brooks or springs which are abundant. The distance from Kulab to Muminabad is 25 versts, and the road good throughout. The inhabitants of this valley are Tadjiks, who occupy themselves with husbandry. Along the eastern edge of the valley, from north to south, extends a ridge which bears the name of Kuran on the south and Peri on the north, and separates the

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* I. e. Little Surkhab. † I. e. new fortress.

‡ Chief place of a district formerly known as Khotlan.]

Muminabad valley from that of Dara. From Muminabad, the road towards Dara runs for about 2½ versts north along the valley, then north-east, ascending a hill to the hamlet of Charga, and after going half through the village, again renews the steep ascent, turning south. At the summit it turns east and lies along the southern slope of a spur of the Peri ridge to Sari-kash-ban pass; the ascent, though steep, is not particularly difficult, being free from stones. The western slope of the ridge is for the most part covered with underwood. The descent from the pass is much worse, being steeper than the ascent, besides being stony. A small stream takes its rise at the pass, and crosses the road at the third verst. At the fourth verst a second rivulet issues forth. The road crosses this, and follows the left bank down to Liangar, a village on the Obi-niaz, 20 versts from Muminabad, and accessible for pack animals.

The region of Dara forms a small separate province, under the jurisdiction of Sho, i.e. a prince, subject to the bek of Kulab. There are twenty-five villages in Dara, situate on either bank of the Obi-niaz, which rises in snowy mountains in the north, and flows south for a distance of nineteen versts to its confluence with the Panj, at Tagnau, opposite the village of Khuvan. Dara is mostly inhabited by Tadjiks, who are chiefly engaged in agricultural pursuits, and supply the province of Shikai with corn.

The road to Shikai, from Liangar, follows the right bank of the Obi-niaz in a northerly direction. At the second verst, on the left bank, is the village of Vashel; at the third verst, to the right of the road, is Auja, and on the left bank, Khambel; at the sixth verst, Dashi-Kolon. Here the road crosses to the left bank of the river, and takes the direction of Gren, on the left bank of a rivulet of the same name, which rises in the Kui-frush, snowy mountains. From Gren the road ascends the mountain, and, after passing the small hamlet of Serengan, turns to the east, passing along the northern slope of one of the spurs of the Kui-frush. At the third verst it crosses to the southern slope of the spur by the small col of Polokh. It then continues along the southern slope to the Val-Valiak pass, which it ascends by steep zigzags, difficult for pack animals, and only to be accomplished by men on foot, necessitating stopping every 100 or 150 feet to recover breath. The descent is even worse, being more stony. On either side of the road, leading from the pass, is a brook, and when we crossed the ravines were full of snow. After a verst of descent, Jari-sai-dan is reached. Here the rivulet Sari-bogio starts from the north-east to unite with another stream which comes from Vai-Valiak pass, their united waters forming the little river of Obi-sanghi-shaun, which has a south-easterly course to the Panj. From Jari-saidan the road keeps along the right bank of the Sari-bogio for two versts and upwards over snow at least 14 feet thick. One and a half verst from the pass, the road crosses to a small spur, and keeps along it to the pass of Bandi-kul by a series of zigzags over a rocky soil. The descent must be performed through snow; at the bottom is a small lake, half covered with ice when we saw it. From the lake there is another ascent to the Kalendar-kush-dagi pass. A ravine leading from the lake in a northerly direction is called Kadiravnau. From the pass of Kalendar-kush-dagi there is a descent into a deep ravine, into which fall streams to the right and left, forming the little river of Obi-sarijar. The road crosses to its left bank over snow, a verst from the pass, and a verst further recrosses to the right bank. The whole bed of this river is blocked by enormous masses of fallen rock, over which horses have difficulty in picking their way. At the following verst the road crosses to the left bank by a poor little bridge, and after following it half a verst down, returns to the right bank. The road then ascends a small pass, and descends in a slanting direction to the village of Jar, on the river Panj. Below the second bridge the Sari-jar-dara is joined by the Varjutch rivulet, and after its union with

this stream takes the name of Jar and Mar, two hamlets divided by it. Mount Kui-frush serves as the border between Shikai and Dara. The road from Val-Valiak is very inconvenient, and only practicable on foot, or with asses which ply with corn between Shikai and Dara. On arriving at Shikai by this road the governor was greatly astonished at my march and appearance, as no Russian had passed this way before.

From Shikai the road, starting at the hamlet of Jar, runs to Kala-i-Khumb by the right bank of the Panj, and to Kuf by the left bank. At the third verst, on the left bank, stands Fort Jorf, on either side of which is a hamlet of the same name; and above the fort, on a small plateau, the hamlet of Moi-maiak.

Fort Jorf is 350 feet long by 210 wide; its wall, on the side of the river, has a height of 1½ arshine (3½ feet); the other three sides and the corner bastions are four arshines high (9 feet) by 1½ thick (3½ feet). All the walls and towers are built of clay, mixed with stones. The governor of Shikai resides here. Five versts from Jar lies the hamlet of Milvan; at the 6th, on the right bank, is Puni-than, and on the left, Sang-lel; at the 8th, Gumai, on the left bank; at the 10th, Zingarin, on the same bank; at the 13th, on the right bank, Ishkef; at the 15th, Yeghit; at the 18th, on the left bank, Shilgovan; at the 22nd, on the same bank, Khuvan; at the 24th, on the right, Patkinau; at the 26th, Ravat; at the 28th, Sangen; at the 35th, Zypk; at the 36th, Umark; and at the 38th, Fort Kala-i-Khumb. The whole way from Jar to Kala-i-Khumb the road follows the bank of the Panj with a north-easterly direction, for the most part along slopes, but in several places along cornices, overhanging bridges and balconies, fastened to precipitous cliffs, and supported by various expedients. In many places we had to take the packs off the animals and carry them in our hands; for the bridges and balconies were too narrow to allow a laden horse to pass.

The province of Shikai numbers some 500 houses or farms; the inhabitants are Tadjiks, doing but little agriculture, and in some parts none at all; for the surrounding mountains are too steep and stony to admit of it. The herds are all driven into the mountains for the summer, and remain there till late in autumn; for there is no good pasturage near the villages. The inhabitants make butter and cheese (kurt) of milk, and dry it for winter use. As only some of the hamlets have a small quantity of corn, the inhabitants of Shikai make bread of the fruit of the mulberry-tree, which is largely cultivated, and attains a good size; whilst other fruit trees—for instance, the pomegranate—grow as bushes among the rocks. The buildings of Shikai are mostly of stone and clay; but in some places they are occasionally to be met with entirely of clay, plastered and whitewashed, and the roofs covered with alabaster, though thatched roofs are not uncommon. The latter resemble the Russian double-sloped roofs. Such roofs are common all over Hissar, Kobadian, Kurgan-tiube, and in parts of Kulab. The villages of Shikai are remarkably clean—all the courtyards and open spaces between the buildings being kept swept and free from dirt; perhaps owing to their having no cattle to soil them. Nearly all these villages stand on brooks bearing the names of the respective villages they water.

Fort Kala-i-Khumb* lies on the right bank of the Panj, and on the left bank of the Khumb-au, which here falls into the Panj from the north. The fort is 280 feet long, and about 200 feet wide; it is built of rock and timber, laid in clay, and

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* I. e. fort of Khumb, the chief place of Darwaz. In this name we have probably a trace of *Kumidha* of Hwen Thsang and *Comedæ* of Ptolemy. Cf. Col. Yule's introductory essay to Wood's 'Oxus,' p. xxxix. Kala-i-Khumb is said to contain 100 houses, i. e. about 500 inhabitants.

plastered over with this material. The walls are six arshines (14 feet) high by 2½ (5½ feet) thick; they have six towers built in the same way. Inside is the residence of the bek, and about it is his garden of fruit trees, surrounded by a wall, also made of clay and stone, with a height of four arshines (9 feet). Near the fort is the bazaar and a barrack for soldiers, of whom the bek has 1000; though, according to my information, there are not more than 400, and the same number at Baljuan. One verst higher up the Panj stands another fortress, 175 feet long by 140 wide, built of the same material as Kala-i-Khumb, and now deserted.

III.—From Kala-i-Khumb viâ Tavil-dara to Bala-Vakhia and back.

From Kala-i-Khumb to Fort Tavil-dara (on the Vakhia) * is about 50 versts (33 miles). For 10 versts the road goes in a north-easterly direction; 3½ versts beyond it lies along the right bank of the river Khumb-au, where it crosses by a bridge to the left bank. At the seventh verst to the left of the road is the hamlet of Zif, but at the eighth verst the road again crosses to the right bank, which it follows to the confluence of the Obi-Khimon with the Khumb-au, the former of these streams taking its source at the pass of Tangi-murghabi, where it is fed by springs from the snowy mountains. Above the junction of these rivulets up the Gushan are four hamlets, Khasht, Apchat, Ugurk, and Gushan. The road to Tavil-dara lies along the rivulet Obi-kham-ravat, crossing it several times, at first by small bridges and then merely by fords. At the fourth verst above the junction of the rivers to the left of the road, on a mountain, is the hamlet of Hope; at the sixth verst, to the right, also on a mountain, is the hamlet of Ribot. The ascent to the pass † is not steep, and the road generally is easy for horsemen, but too narrow and rocky for artillery, especially in two defiles, which are quite impassable. The descent from the pass is also not steep, and lies over softer ground. At the fifth verst beyond the pass, to the right of the road, is the hamlet of Sagri-dasht, situate on a brook.

To the north of Sagri-dasht, and a verst from it, is the hamlet of Kulumbak, and to the east of this, two versts from it, in a glen, the hamlet of Kamchak. At the eighth verst the road crosses by a bridge a brook flowing in a deep ravine. To the right of the road on both sides of the brook lies the hamlet of Tautan-sailiau, and to the left, a verst off on the left bank of the same brook, the hamlet of Chulumbak. From the bridge a road branches off in the direction of Baljuan, ascending the brook. The road to Tavil-dara after crossing the bridge suddenly ascends a mountain in a northerly direction. The ascent is steep but not rocky. The pass is called Zoogussi, and the descent from it leads into a deep glen, which the road follows for six versts to the hamlet of Lesser Tavil-dara, over difficult and rocky ground. From the lesser Tavil-dara to Fort Tavil-dara the distance is four versts. Fort Tavil-dara stands on the left bank of the river Vakhia; it has a length of 210 feet and a width of 175 feet; it is built of stone and timber laid in clay. The walls are four arshines (9 feet) high and two arshines (4½ feet) thick. The corners are protected by square bastions, but there is no moat round the fortress; within are some buildings occupied by the commander, who is also considered bek of Vakhia. From Tavil-dara the road to Gharm ‡ crosses a bridge 105 feet long, built over the Vakhia. This bridge is too

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* We have ventured to alter the name of this river to *Vakhia* throughout the narrative though Dr. Regel prefers calling it *Vaksh*, this name being given on all maps hitherto published to the Surkhab, the river of Karateghin and one of the chief headwaters of the Oxus.

† The mountains crossed by this pass are known under the name of the Darwaz range and form the watershed between the Panj and the Surkhab.

‡ Chief place of Karateghin.

narrow to admit of vehicles, and must be crossed on horseback, but it is usual to dismount and lead your horse over. Having crossed the bridge the road for a distance of twenty versts lies along the right bank of the Vakhia to Fort Chil-dara, and along this part the following hamlets are situate:—on the right side, at the sixth verst, Yezgan; at the seventh, on the left bank, Jira; at the ninth, on the same bank, Dashta-khosan. Lower down, at the twelfth verst, on the left bank, lies Kham-dara; at the thirteenth verst, on the right bank, is the hamlet of Ribodnal, and to the left that of Ghirdau. At the seventeenth verst is the hamlet of Shur, on the right bank; and at the twentieth, on the right bank, Fort Chil-dara, while facing it on the left bank is Pator. All the before-mentioned hamlets stand on brooks, which bear the same names as the hamlets situated on them. The whole road, twenty versts in length, is suitable for baggage animals, but too narrow and difficult for artillery, especially where it is carried along cornices. Both banks of the river are covered chiefly with bushes of various kinds, amongst which occurs the wild maple. From Fort Chil-dara there are two roads: one, northwards to Gharm viâ the hamlet of Shakaú—there are no more hamlets as far as the pass; the other lies along the right bank of the Vakhia to the hamlet of Surkh-ab. There is a road along the left bank of the Vakhia, but it is not so convenient.

The road from Tavil-dara up the Vakhia follows the right bank of this river in a north-easterly direction at an angle of 52°, and passes the following hamlets: at the third verst, Liangar; at the fifth, on the left bank, Sikhuni; at the seventh, on the right bank, Ghurkham; at the ninth, Yeftam; at the eleventh, Khur; at the fifteenth, Gurum; on the left bank, Pashtyr, at the confluence of the Sagri-dasht with the Vakhia. From Pashtyr a road leads to Sagri-dasht, but it is not very easy to travel. At the seventeenth verst, on the left bank, is the hamlet of Marga; at the nineteenth, on the right, Sayat; at the twenty-first, Vudjun; at the twenty-seventh, Zapsi-kharp, situate on the Obi-shuraf; up its left bank lies the road to Karateghin. At the thirtieth verst is the hamlet of Yufan; at the thirty-second, Punar-bak; at the thirty-fifth, Shipilien; at the thirty-seventh, Liukharvi, on a rivulet of the same name; up its left bank runs another road to Karateghin, across a pass of the same name. On the left bank of the Liukharvi are the ruins of an old fortress. At the fortieth verst is the hamlet of Khul, on the left bank; and at the forty-third, on the right bank, Khipshu; at the forty-seventh verst is the hamlet of Argan-kun; and on the left bank, on a very picturesque high tableland, above which rise the snowy mountains bearing the name of Chalim-dara, is the hamlet of Minadu straggling along five versts of ground. At the fifty-first verst is Liangun, and at the fifty-third Lesser Liangun, both on the right bank. Here the road crosses a bridge constructed over the Ravnau rivulet, one of the chief tributaries of the Vakhia. From this a road lies up the left bank to Karateghin across the Ravnau Pass. From Tavil-dara as far as the hamlet of Lesser Liangun the road is good, except in a few places, but beyond it becomes very bad. After crossing the bridge the road ascends by a somewhat steep slope, which terminates in a small but smooth plain. The road then again rises over a steep spur, along which it goes for half a verst, and then descends to the Vakhia by a steep slope. At the fifty-fifth verst is the hamlet of Gobinas, at the fifty-eighth Avraniyi, at the sixtieth Gavdi-balian, all on the left bank of the Vakhia. At the sixty-third, on the right bank, is the hamlet of Nigai-gudi, at the sixty-seventh Liangar. Hence the road to Karateghin follows the right bank of the Obi-Liangar across the Kaptar-gardan (dove's neck) Pass. There is a bridge on the Liangar. At the seventy-second verst is Kurgan-liajur, on the left bank of the river Obi-uzman, the place of residence of Kurgan-bek. At the seventy-fifth verst is the hamlet of Liajur, and on the left bank Sarkha. At the eightieth verst, on the right, is Rekhtch, and on the left Psoda, on a river of the same

name. At the eighty-second verst is the hamlet of Urfat, at the eighty-sixth, on the right, Sykak, and at the eighty-eighth, Sanvar. Beyond this, according to Kurghan-bek, there are no hamlets, only encampments of Kirghiz.

According to the bek of Darwaz, the valley called Bala-Vakhia opens out beyond and affords rich pasturages for cattle. The inhabitants of Vakhia are Tadjiks. They speak a mixed Persian and Uzbek dialect, and are engaged in husbandry and horticulture as far as circumstances will permit. I found here pears and apples growing wild, and the fruit was equal in taste to those grown in European Russia.*

Underwood is also abundant here. The mountains are only covered with vegetation near Tavil-dara, and beyond it there is none to be seen. The river Vakhia has a great flow of water; in several places where it divides into branches the width of its channel is as much as 2100 feet, and during the spring floods the whole of this is under water. There are no fords, ferries, or bridges along the above route. Intercourse between the hamlets is kept up on *amatas* (leather bags), but I did not see any crossings effected in this way. Along the whole distance traversed by me along the Vakhia there is only one bridge, viz. that at Tavil-dara, which is built in the narrowest part of the river, and is (as already stated) 105 feet long. At this spot the water dashes along with extraordinary violence. The chief affluents of the Vakhia are, taking them in order according to their size: the Obi-Shurava, Moli-Kharva, Obi-Ravnau, the largest in size, the Obi-liangar and Obi-uzman, all flowing into the Vakhia on the right side. On the left only the Sagri-dasht and Psoda join this river. Besides the above tributaries a number of small streams join the Vaksh, for every village or hamlet stands on its separate brook. According to the inhabitants the winter here is very severe; snow falls in such quantities as to bury buildings, and the inhabitants have to climb out by the roof. When I was at Kurghan-liajur at the end of August, the cold was such that I was obliged to clothe myself warmly. But according to Kurghan-bek, with whom I spoke on the subject, the end of August is their hottest time, their regular summer. Snow here lies almost down to the hamlet itself. Fruit was only just ripening during my stay, and corn was still green. They told me, in answer to my question, that it would be ready to cut in three weeks, i.e. at the end of September.

IV.—From Kala-i-Khumb to the Head-waters of the Vanj† and back.

The road from Kala-i-Khumb follows the right bank of the Panj, mostly along cornices and balconies; it is rocky and narrow, and in spring quite impassable. At the second verst, on the left side, lies the hamlet of Dekhtilitch; at the fourth verst, on the right, Razyvai; at the fifth, the pass and ruins of Madu-kakai. On the left the rivulet Javai falls into the Panj, having the hamlet of Dagana situate a verst from its bank. At the tenth verst is the hamlet of Kibrak, on the right; at the thirteenth, Jumar, on the left; at the fifteenth, Kutali-kaivan Pass; at the nineteenth, Fort Jorf; at the twenty-third, the hamlet of Vitch-kharf; at the twenty-eighth, Uz-kharf, with its brook; at the thirty-first, Sho-ada, both the last-mentioned being situate on the right side. At the thirty-fourth verst, on the left side, the large village of Moi-mai. One verst from this village the road ascends

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* Wood heard that the hill states of Roshan, Shugnan, and Darwaz abounded in stone fruit, and that the mulberry was plentiful. Cf. Wood's 'Oxus,' p. 249.

† The Vanj flows into the Panj at Fort Jumarj, 30 miles below the mouth of the Ak-su or Murghab. The southern elbow shown in the map in Suppl. Papers R.G.S., vol. i. part 2, drawn according to Dr. Regel's surveys, and not shown on any other map of the Upper Oxus regions where they have been surveyed by native Indian explorers, is probably a mistake.

somewhat abruptly to the pass of Dash-tyro, descending again by an equally steep gradient to the hamlet of Khargovat. At the forty-sixth verst is the hamlet of Yegitan, on the left side; at the forty-ninth, on the right, Pish-kharf, on a brook of the same name, and on the left the hamlet of Moi-mayak. At the fifty-sixth verst is the Uz-kharf rivulet, across which a bridge has been thrown; at the fifty-seventh verst, on the left, is the Khos-dara rivulet. At the sixty-first, on the same side, lies the hamlet of Var-fat; at the sixty-third, Vot-khosh, on both banks; at the sixty-fifth, on the right side, Vor-khur; at the sixty-eighth, Vot-khil; and at the sixty-ninth, on the left bank, Jumarj. Here the road to Shughnan crosses to the left bank of the Panj, and from Jumarj ascends a mountain. On the right bank of the Panj there is no road. Opposite Jumarj the river Vanj falls into the Panj.

The road to Vanj follows the right bank of the river of the same name, keeping a north-easterly direction. At the fourth verst, at Vot-khil, it crosses a small pass and continues further along the edge of the valley of the river Panj. At the seventh verst, on the left side, is the hamlet of Vitch-kharf; at the tenth, Ráú; at the eleventh, Skot; at the fourteenth, Ish-khan, on the left side; at the seventeenth, the village and fortress of Vanj. The river Vanj higher up its course, as far as the hamlet of Mazar, has a north-easterly direction, the compass-bearing as far as the hamlet of Mdekhar being 45°, and from Mdekhar to Mazar 65°. The bed of the Vanj from its confluence with the Panj as far as Mazar is rocky, with a breadth of 700 to 2100 feet. The Vanj in many places divides into numerous channels, so as to be fordable in autumn. At Mazar the valley narrows and forms a defile, and at the ninth verst above Mazar the Vanj takes its source from the confluence of two brooks—the Kasho-laiak coming from the north-east, and the Dara-abduka from the south-west. Beyond the meeting of these streams is the beginning of a great snowy range, which extends from north to south.

The road from Fort Vanj up the river of this name passes the following hamlets: at the third verst, Bóú; at the fourth, on the left side, Gum-maiak; at the eighth verst, on the right, Bulai, where the road crosses to the left bank by a ford to the hamlet of Ráú. At the eighteenth verst, on the right side, is Patau; on the left, Jaul; at the twenty-first is Ubdo; at the twenty-third, on the right side, is Sadivar; at the twenty-sixth, Sif; at the twenty-eighth, Tekhar; at the twenty-ninth, Breshi, and on the left side Chihaf; at the thirty-first verst, Udob, and on the left side Rafgada; at the thirty-fifth verst, Khirgovat, and on the left side Rjavatch; at the thirty-ninth verst, Mdekhar, and on the left side Ush-kharvag; at the fortieth, on the left side, Gumas; at the forty-third verst, on the right side, Satar. Hence the road follows the Obi-sitar to Bala-Vahia across Akba-isturgi Pass. This road is only accessible to pedestrians in June and July; in August and September it becomes impassable, owing to the crevasses and holes in the ice, across which it is impossible to make one's way. On the left bank, opposite Sitar, lies the hamlet of Liangar; at the forty-fifth verst is Marjutka, and on the left side Gharm-cheshma; at the fifty-second verst is Vanj-vanj, and Sungat on the left bank. Here the beaten track disappears, and Mazar is reached by riding over the rocks in the valley of the Vanj. Beyond this there are no roads. With reference to the one shown on the map which goes over Kiangla Pass, and another from the iron-mines in Karateghin, of these roads, as well as of the Kiangla Pass, the inhabitants know nothing. According to the oldest inhabitants of Mazar, nobody ever went by them during their lifetime. Hunters who have gone two tash, i. e. 15 versts (10 miles) further, say there is no possibility of going beyond. Huge ice-fields and masses of snow cover all the ravines and defiles which give birth to the Dara-abduka and Kashe-laiak. As to the road into Karateghin, in my opinion the Bala-Vahia must first be crossed, and only then if there are roads can the traveller enter Karateghin.

On my return from Fort Vanj to Kala-i-Khumb I happened to travel in company with the former bek of Vanj, who held this post when Darwaz was still independent of Bokhara. At one of the passes we were talking about routes from the river Panj to the Vakhia, and he told me of a tolerably good road from Uz-kharf, on a brook of the same name, to Kurghan-liadjur, and from Psoda to the Vakhia across Akbai-uzkharf Pass. As my interpreter was suffering greatly from fever I started for Viskari-bolo, whence I reckoned upon at all events reaching the pass, but my guide positively refused to take me thither. None of the inhabitants of Viskari-bolo, whether from fear of giving offence to the bek or for some other cause, would guide me to that pass, and I had to return without visiting it to Kala-i-Khumb, where I began to suffer agonies from mountain fever, which had been in my system about two months. The want of any medicinal relief obliged me to return to Samarkand.

GEOGRAPHICAL NOTES.

Further Explorations of Congo Tributaries by the Rev. G. Grenfell.—In a letter dated October 30th, from Stanley Pool (communicated to us by our Associate, Mr. A. T. Bowser), Mr. Grenfell gives a brief account of another voyage of exploration in the steamer *Peace*, of ten weeks' duration, which he had just completed. The trip was devoted to the examination of two tributaries of the left bank, the only rivers of any importance that remained unexplored between the mouth of the Kasai and that of the Lomame or Lubiranzi. The more northerly of the two, named Lulongo, falls into the Congo in 18° 42′ E. long. and 0° 41′ N. lat. Mr. Grenfell ascended it as far as 22° 32′ E. long. and 10′ N. lat.; it therefore follows a course nearly parallel to the main stream. The more southerly stream, called the Boruki, or Black river (18° 36′ E. long., 0° 6′ N. lat.) was found to be formed by the union of three streams, of which the Boruki, properly so called, is one, and joins at a point three miles from the mouth. It is not navigable for more than six or eight miles. The other two join in 19° 7′ E. long., and 0° 20′ N. lat., and the one ascended, named Juapa, was navigated as far as 23° 14′ E. long. and 1° 1′ S. lat., when it was still an open water-way 100 yards wide, 12 feet deep, and having a current of nearly 200 feet per minute.—The same mail which brought the above-mentioned letter, brought also the missing sheets * of the chart of the Mobangi, the great northern tributary, the exploration of which was one of Mr. Grenfell's most brilliant feats. The chart is in ten sheets and is drawn on the scale of half an inch to the mile. We hope next month to be able to publish a reduction of this map.—It appears to be agreed that this fine river, which if the Wellè is its upper course or one of its tributaries, as appears to be the growing belief, offers a navigable water-way to the heart of the continent, falls within the frontier of the Congo Free State, quite clear of the French boundary.

* Vide 'Proceedings R. G. S.,' vol. vii. 1885, p. 538.

Mr. H. O. Forbes' New Guinea Expedition.—In a letter dated October 4th, Mr. Forbes informs us that he arrived at Port Moresby on the 31st of August, and having made a dépôt at Sogere, a native village four days' march in the interior, and completed the organisation of his party, he made a final start for the Owen Stanley range on the 25th of September. The expedition consists, besides himself, of three Europeans, viz. Mr. J. M. Hennessy (assistant-topographer), Mr. C. G. Andersson (botanist), Mr. J. Lopes (taxidermist), two Amboynese and twenty-one Java coolies.

Mount Cameroons.—M. de Rogozinski has lately returned to Europe from the Cameroons, where he has made extensive explorations among the group of mountains of which Mount Cameroons is the culminating elevation. He brings much new information regarding the whole region. He states that the native villages situated in the habitable zone (up to 3300 feet) number about sixty, the western slope of the range being the most thinly populated. Although the climate is relatively good, yet water is very scarce in all the villages. Palm-oil and indiarubber form the principal articles of commerce. He is, however, of opinion that the future development of the country lies in agriculture, the soil being one of the richest in Africa. The villages consist generally of about four huts, each governed by its own chief. The people are difficult of access, but improve upon acquaintance. The slave trade does not exist in the mountainous region. A large number of barometrical and thermometrical observations have been taken by M. Rogozinski, which show that the changes of temperature are very great. The different dialects spoken form an interesting study, and the traveller has collected a large number of words belonging to the Bakwiri, Bamboko, and other dialects, from which he intends to prepare a comparative vocabulary. We hear that he is preparing a narrative of his explorations for general reading.

The Store Björgafjeld and Kola Peninsula.—M. Ch. Rabot has recently returned from a journey to Northern Norway and Russian Lapland. With regard to the Store Björgafjeld, he states that the mountains are not covered with glaciers as represented on Munch's map; he did not find one primary glacier, but only came across a few large sheets of ice, which can hardly be called glaciers. The Store Björgafjeld has a mean elevation of 3600 feet, but is not a plateau as supposed. Some of its culminating peaks reach an altitude of 5900 feet. The valleys and lower summits are clothed with magnificent forests, where firs measuring 10 feet in circumference are frequently seen. Journeying from this country, M. Rabot reached Kola, and traversed Russian Lapland from north to south, following the long line of depression which extends from the White Sea to the Glacial Ocean. Lake Imandra is, according to the traveller, wrongly represented on our

maps. The lake is dotted over with numerous small islands and surrounded by two important ranges of mountains, whose highest summits attain an elevation of 3300 feet. The whole country is more hilly than previously described. The traveller mentions three mountain ranges extending between the White Sea and Arctic Ocean, the most southern being situated between the White Sea and Lake Imandra, the next between this lake and the Beringa Ozero, and the third between the Notozero and the Glacial Ocean.

The Dobruja.—It may be useful to note that in part ii. of the Consular Reports of the year is a detailed account of the Dobruja (Dobrogea) by Vice-Consul Cumberbatch. Mr. Cumberbatch has made a thorough study of the country in various aspects, and removes some misconceptions concerning it. There is a very complete account of the geography,—limits, divisions, mountains, forests, mines, rivers, marshes, lakes, islands. The total area of the Dobruja is given at 3,690,000 acres (about 5766 square miles), separated into two natural divisions,—2,460,000 acres of productive land, and 1,230,000 acres of unproductive marshes, alluvion, and sand. The first division, comprised in the Dodruja proper, forms a plateau, the soil of which is of tertiary formation, and is very fertile. Covered in the northern and southern regions with undulating valleys, dominated by mountains that run principally along the south bank of the Danube, it is also well supplied with water. The central zone of this division is a flat country with a scarcity of watercourses. The extensive unproductive district is composed of lakes or "baltas," formed by the periodical overflows of the Danube and its branches, and includes the whole of the Delta, the region comprised between the Dunavetz and the St. George's mouth, the north-west corner of the Dobruja, and the sands extending nearly the whole length of the coast.—The climate, Mr. Cumberbatch states, does not deserve the reputation for unhealthiness which it has for the most part acquired. It is very similar to that of Roumania proper, especially to that of the districts of Braila and Jalomitza, that is to say, temperate and variable. Then follows a sketch of the history, and of the ancient remains in the country. A considerable section is devoted to population, which the latest official statistics estimate at 150,600, much too high, Mr. Cumberbatch thinks. The Roumanians number about 40,000; Tartars, 27,000; Turks, over 20,000; Bulgarians, 29,830; the remainder being mainly Russians, Greeks, Jews, Armenians, and Germans (3071 of the last). Then follow sections on the sanitary state of the district, government, public works, religion, education, agriculture, commerce, industries, navigation, principal towns, and other points.

A New Island in the Friendly Group, South Pacific.—The Rev. S. W. Baker, Premier of Tonga, has sent us a graphic description of a submarine volcanic eruption near Tongatabu, in October last, of which he

was an eye-witness, and which resulted in the emergence of an island about three miles in length, one mile in width, and 150 feet high, at a point 48 miles distant from Nukualofa, in a N.N.W. direction. The eruption commenced with a slight shock of earthquake felt in Tongatabu on the 11th of October. On the 13th, at the request of the king, Mr. Baker and a party of Europeans and natives sailed in the direction of the outburst in the *Sandfly*, and made detailed observations of the phenomenon at the distance of a few miles. From the surface of the sea a vast mass of comminuted volcanic matter, mingled with clouds of carbonic and sulphurous gases, was ejected with prodigious force to a height of several thousand feet, the heavier matter quickly falling, the vapours expanding above into clouds of dazzling whiteness and fantastic shapes, and the lighter volcanic dust of a light-brown colour drifting away at a great elevation. This mass of erupted matter was ejected from three large and a number of minor jets, the column from the largest one rushing upwards from time to time like a solid wall of dark matter, often branching like a pine-tree. As night closed-in the erupted matter at high elevations no longer appeared a huge mass of snowy cloud, but changed to grey and sooty black, and there were no traces of fire. The next morning (October 14) the *Sandfly* approaching nearer, Mr. Baker and his companions were rewarded by a sight of an island, formed by the eruption during the night, which was then about forty feet high, the highest part being the rim of a crater at the edge of the island. The eruptions continued with increased frequency; on timing them, it was found that each upthrow, carrying hundreds of tons of matter, took from twelve to sixteen seconds to reach its greatest altitude. All became suddenly quiet at 8.30 A.M., and moving nearer, the party, at the distance of a mile, saw the crater very distinctly, and judged it to be at least two miles in circumference. The volcano recommenced action shortly afterwards, when the *Sandfly* had glided just out of reach, and fragments of heated stone and showers of cinder were hurled to a great height. Signs of fire were first visible at 7.30 the same evening, and continued throughout the night. The new volcano forms one of a linear series of six in the Friendly Islands group, the highest of which, Mount Kao, is 5000 feet high. After some days' intermission, the eruptions (October 18th and 19th) recommenced as violent as ever.

Lieutenant Holm's Expedition to East Greenland.—As announced in our last Number, the Danish Expedition to the East Coast of Greenland has returned to Copenhagen. It has more than fulfilled what it undertook to do. Under the command of Lieutenant (now Captain of the Fleet) G. F. Holm, the expedition has succeeded in reaching a far higher latitude than has been the case since Graah's visit fifty years ago, and, with the exception of Jens Munk, in the days of Christian IV., and the above-mentioned Graah, Holm now has the honour of being, amongst Danish Arctic travellers, the one who has gone further north

along the East Coast of Greenland. Accompanied by Midshipman Knutsen and the Greenland interpreter Johan Petersen, with one canoeman and six women, Holm started with two *umiaks* (woman boats). He parted company from the other members of the expedition, who, under the command of First-Lieutenant Garde, were to go south, and of whose proceedings the *National Tidende* has already given some account. The separation took place at Tingmiarmiut, in 62° 40′ N., on July 30th, 1884. The northern party passed the furthest point of the Dannebrog Islands and Graah's cairn—still standing, but empty—and made additions to Graah's map. They then proceeded onwards, reaching the most inhabited district called Anmagsalik, at Cape Danel, which is some 1000 feet high, and is not the cape called by this name by others. There they built a Greenland hut, near Tasiusasfik, which was their headquarters during the winter of 1884–85, in 65° 37′ N. and 37° 10′ W. The Greenlanders met with here were a very primitive people, who had never had any intercourse with Europeans. They numbered about 400. Holm and his party made a journey further on, beyond the last inhabited spot, which is called Sirmilligak. Here they raised a cairn in lat., by observation, 66° 8′ N. They named the country after Christian IX. In returning they examined many fjords and islands, taking photographs and making collections, of which as much as could be taken in the boats (or rather boat, for one was used in building the house) was brought home. They also visited the bay which Nordenskiöld visited in 1883, but Holm saw no traces of his visit, nor did the natives give him any account of it, although this bay is a favourite fishing place, often visited by natives. No cairn was found. On the whole extent of the east coast there is no sign of European occupation, with the exception of the rivers at Lindenau Fjord, far to the south. The expedition reached Umanak on the 18th of July, in 63° N., and the southern division joined them on the west coast on August 15th. They returned to Europe in the *Constance*, bringing back a very large contribution to ethnology. They were in winter quarters from October 1884 to July 1885. Greatest cold, 21 degrees below zero (Fahr.).

M. Chaffanjon's Second Journey to the Orinoco.—M. Chaffanjon * has been entrusted by the French Minister of Public Instruction with a new scientific mission to the basin of the Orinoco. His project is to ascend the Orinoco as far as the river Cassiquiari, where he is to remain six or eight months, for the purpose of studying the manners and customs of the natives, and making collections of the fauna, flora, and geology of the country; he will also make a special study of the manner in which the junction of the basins of the Amazons and the Orinoco is brought about by means of the Cassiquiari river, a physical feature which merits some further investigation. M. Chaffanjon is to start on the 25th of January, and is not expected to arrive at Paris, on his return, before

* See 'Proceedings R. G. S.,' vol. vii. 1885, p. 820.

June or July of 1887. He intends to return from the Cassiquiari, if possible, by the Sierra-Parima and British Guiana.

Aerial Formations of Soil.—With reference to M. V. d'Aouest's communication * on this interesting subject, M. Jules Garnier has contributed further facts in confirmation, in a letter to the Geographical Society of Paris. He gives two examples which had come under his notice. The first is in the Loyalty Islands, where at Lifu he found a bed of ferruginous clay of varying thickness on the top of the coral formation; this clay bed is not, according to M. Garnier, the result of aqueous deposits, there being no watercourses or ancient beds of rivers in the island, but is evidently a precipitation of matter from the atmosphere, and due to the activity of the volcanoes of the New Hebrides. The other instance is on the sandy plains of the Sahara, where springs of water rising into the air catch particles of dust, with which the atmosphere is charged by the least breath of wind, and deposits are formed.

Lieutenant-General Sir Arthur Phayre.—This distinguished Indian officer and administrator, formerly a member of our Council, died on the 15th of December. We hope to be able to give an account of his public and scientific services in the Obituary of our next issue.

Fund in Aid of Scientific Research.—A fund has been established by Mrs. Elizabeth Thompson, of Stamford, Connecticut, "for the advancement and prosecution of scientific research in its broadest sense," and now amounts to 25,000 dollars. The endowment is not for the benefit of any one department of science, but the trustees announce that they will give the preference to those investigations, not already provided for, which have for their object the advancement of knowledge or the benefit of mankind in general, rather than the solution of questions of merely local importance. Applications for grants should be forwarded to the Secretary of the Board of Trustees, Dr. C. S. Minot, 25, Mount Vernon Street, Boston, Massachusetts, and they must be accompanied by a full statement of the nature of the investigation, the conditions under which it is to be prosecuted, and the manner in which the appropriation asked for is to be expended. The first grant will probably be made early in January 1886.

THE EXHIBITION OF APPLIANCES USED IN GEOGRAPHICAL EDUCATION.

This Exhibition, which has been arranged in the Galleries, 53, Great Marlborough Street, was formally opened to the public by the Marquis of Lorne, the President of the Society, on Tuesday, December the 8th, in presence of many Members of the Council, Fellows, teachers, and others interested in education. The Galleries consist of three large rooms, the

* 'Proceedings R. G. S.,' vol. vii. 1885, p. 614.

hanging space having been increased by the erection of screens. On the walls about 200 school maps have been hung, collected from our own country and the principal countries of the Continent. These maps are arranged geographically, beginning with the world, and going on to Europe and the other continents and their divisions. The object aimed at in arranging the maps is to bring side by side, for the purpose of comparison, the maps of similar regions used in different countries, and issued by various publishers. A department is devoted to elementary geography, in which the apparatus used in London Board Schools are arranged along with similar appliances used in other countries. The atlases are arranged in a case and on tables, and the text-books in shelves also on tables. On other tables are arranged various exhibits,—telluria, planetaria, globes, ethnological busts, specimens of pupils' work, small and large reliefs. In the centre of the large room stands a fine large relief of the Monte Rosa group, on the scale of 1 : 150,000 ; and on another table a contoured relief of the bed of the ocean around the British Islands, by Mr. J. B. Jordan. On the screens are hung small relief maps, geographical pictures and other objects; while other large reliefs are placed on easels throughout the galleries.

The Marquis of Lorne, in opening the Exhibition, said he thought that they would all agree with him that they had got together plenty of appliances, and the question remained whether plenty of application could be also obtained. At all events, the Royal Geographical Society had for many years done its best to make geography part of the regular school curriculum. In former days Sir Henry Rawlinson and others had been hard at work on the subject, and yet it remained further off in England than in any other country. It was rather curious that it was so, because after all we in England possessed in the Royal Geographical Society a society to which all explorers and adventurous travellers looked for recognition after their toils and perils and troubles, and yet it so happened that we were not so far advanced in the teaching of geography as some Continental nations. He did not know whether it had struck any one as remarkable that the great discoverers, the English and the Dutch, were backward in land geography; the English had done more than any other to make charts of the sea, and the English and Dutch charts were better than those of any other nation. When a conference was held in America the other day to consider the desirability of having a universal meridian, and it was found that England did not want the Greenwich meridian to be changed, the conference rejected any scheme of the kind. He would be glad to hear from Mr. Keltie the nature of the exhibits from this and other countries. It was said that geography did not pay in English public school education. He was amused the other day by a German lady being asked by an English lady if she could read a map, as she herself could not read it at all. The German lady was quite astonished to hear this, as it had been part of her education to read maps. He could not see how any one could understand the plan of a building unless he could read a map, and the Germans in the Franco-German war showed to what effect the reading of a map might be put in the case of a campaign. He could not help thinking that we should not have made so many political mistakes if we had known geography better. The Exhibition might possibly induce teachers to favour the teaching of geography in schools and universities more than had been done. The Society had

done much to encourage the teaching of geography in schools by inviting some forty of the chief public schools to compete for the medals which it had offered. This had partially succeeded, but only partially; but he hoped we should follow the example of Germany and other Continental nations, and have geography recognised as part of the curriculum of the educational institutions of Great Britain and Ireland.

Mr. KELTIE, the Society's Inspector, then explained the origin, object, and arrangement of the Exhibition. It formed part of his instructions as the Society's Inspector, to collect specimens of the appliances used in geographical education in England and on the Continent. The specimens thus collected were those now arranged in the galleries. The object of the Exhibition was to enable teachers and others interested in the improvement of geographical education, to obtain information as to the various appliances obtainable, and to compare the maps and other objects produced in England with those in use in the leading countries on the Continent. The Exhibition, he stated, was purely educational; only such objects, with one or two exceptions, were shown, as are in actual use in schools. Visitors must not expect to find specimens of the survey maps of various European countries, or of the cartographical masterpieces issued by the best publishers at home and abroad;—though, as the inquiry included Universities, specimens of such work might fairly have been included. Again, the Exhibition is not exhaustive, but representative. It had been impossible to find space for all the maps sent in; but every publisher and every country included in the inquiry are represented by specimens of their work.

Lord NAPIER of Magdala then addressed the meeting briefly on the general utility of geography. He pointed out the importance attached to the subject in the German Army, where at the manœuvres, every third soldier has a map of the ground. He referred to the great advantage in this respect which the Germans had over the French in the Franco-German War, where also maps formed part of the regular equipment of every company. He regretted to find the meagre place given to a subject of such great importance in our public schools, and hoped the Society's action would lead to reform.

Mr. FRANCIS GALTON referred to the previous efforts of the Society to improve geographical education. Many years ago he himself, also with some others, made an effort in this direction, but unfortunately did not succeed in moving sufficient interest in the subject to lead to the desired results. He pointed out what should be the great object in geographical education—to lead the pupil to form a true and adequate and broad conception of the varied aspects of nature all over the face of the earth.

Mr. SOWERBUTTS, Secretary of the Manchester Geographical Society, described the action which is being taken by that Society to improve the teaching of the subject in the north of England. A series of questions has been issued to a large number of teachers, and many answers have been already received. It is intended to sift and classify them, and ultimately to call a conference of teachers to discuss the whole question, with a view to the fuller recognition of the subject in schools, the improvement of methods and apparatus, and if possible, the establishment of professorships or lecturerships in the colleges connected with Victoria University.

After a few words from Mr. BARTHOLOMEW, of the Scottish Geographical Society, the company proceeded to inspect the collection.

On Tuesday, the 15th December, Mr. E. G. Ravenstein gave a lecture on the 'Aims and Methods of Geographical Education'; and on the 22nd, Mr. Keltie lectured on 'Appliances,' both lectures being followed by discussions, in which well-known teachers and other authorities on the subject took part. Reports of these will appear in the next Number of

the 'Proceedings.' On January 19th, Mr. James Bryce, M.P., will lecture on 'Geographical Education from the Historical standpoint,' and probably on the 26th, Professor Mosely will lecture on the same subject in its Scientific aspect. Since the opening, the Exhibition has been daily visited by considerable numbers, evidently interested and desirous of obtaining the information which the collection is calculated to afford.

REPORT OF THE EVENING MEETINGS, SESSION 1885–6.

Second Meeting, 30th November, 1885.—The Most Hon. the MARQUIS OF LORNE, K.T., President, in the Chair.

ELECTIONS.—*William Allan, Esq.; John A. Alsop, Esq.; S. Charles Bell, Esq.; Theodore Francis Bevan, Esq.; Rev. S. D. Bhabha*, M.D.; *Joseph Grant Bickford, Esq.; Archibald H. Boyd, Esq.; Dr. T. F. Bride*, M.A.; *William Hamilton Briggs, Esq.; James Fraser Brigstocke, Esq.; Michael Bugle, Esq.; Arthur Belton Buttrick, Esq.; Dr. James Cranstoun; Daniel Havelock Fisher, Esq.; Sir Wm. Augustus Fraser, Bart.; Hugh Graham, Esq.; Thomas Rannie Grant, Esq.; Rev. James Henry; Thomas C. Jack, Esq.; Harry Berkeley James, Esq.; A. W. Jardine, Esq.; Ven. Arch. Henry Johnson; T. Heath Joyce, Esq.; W. Montagu Kerr, Esq.; William Richardson Kettle, Esq.; Sidney Langston Keymer, Esq.; Charles Lea, Esq.; Rev. Alex. MacKintosh; David McIntosh, Esq.; Paul F. W. Mapp, Esq.; Capt. Archibald T. Miller; Capt. Arthur Moore*, R.N.; *Henry Gartside Neville, Esq.; Joseph Odgers, Esq.; Francis Grant Ogilvie, Esq.*, M.A.; *Joseph Panton, Esq.; Alfred William Parvin, Esq.; H. J. Perkins, Esq.; William Labdon Powell, Esq.; George William Read, Esq.; Lieut. Stefan Szole Rogozinski* (Russian Navy); *W. J. Ryder, Esq.; William Shawe, Esq.; Jno. Malcolm Shepherd, Esq.; Arthur Simpson, Esq.; Henley Grose Smith, Esq.; Joseph Doyle Smithe, Esq.; George Stewart, jun., Esq.; Rev. Alfred Dykes Sylvester; Everard F. im Thurn, Esq.; J. B. Thurston, Esq.; Chas. Jas. Valentine, Esq.; Chas. Morris Woodford, Esq.; Geo. Peacocke Weight, Esq.; Alfred H. F. Young, Esq.*

PRESENTATIONS.—*R. C. A. Beck, Esq.; A. Brookman, Esq.; J. C. Kernahan, Esq.*

ELECTION OF THE SIAMESE AMBASSADOR AS HONORARY MEMBER.

The PRESIDENT announced that since the last meeting His Royal Highness the Siamese Ambassador, brother of the King of Siam, had expressed his wish to become a member of the Royal Geographical Society. Finding that, as a matter of precedent, members of royal families could be appointed honorary members, the Council had sent His Royal Highness an intimation that he would be placed on the list of Honorary Members.

HAND-MAPS FOR THE USE OF THE MEETING.

Before he called on Mr. Montagu Kerr to read his paper, the PRESIDENT referred to the adoption, as an experiment at that meeting, of hand-maps of the region which was the subject of the paper, and stated that the maps distributed on that occasion among the audience had been the gift of a member of the Council, who had been desirous of ascertaining whether it would be a popular and convenient thing for the

members to have such maps. It was very often rather difficult for the audience to see on the large chart hung on the wall at some distance from them the route taken by the travellers who recounted their adventures and explorations. Whatever might be the decision of the Council with regard to continuing the practice, they were all very much indebted to the gentleman who had provided the maps that evening.

The following paper was then read:—

"A Journey Overland from Cape Town across the Zambesi to Lake Nyassa." By W. Montagu Kerr.

The paper, with map and discussion, will be published in the February number.

Major Greely, of the late American Arctic Expedition.

After the discussion ensuing on the reading of Mr. Kerr's paper,

The President announced that there was present at the meeting a guest whom he was perfectly certain they would all wish to greet, a gentleman who had already done the Edinburgh Geographical Society the honour of being their guest—Major Greely, of the United States Army, whose wonderful escape from death must still be fresh in all their memories. It was by no means uncommon for British sailors and American sailors to co-operate in pushing the cause of science, but it was not so common for an officer of the American regular army to be employed in such explorations. All would remember the intense anxiety that was felt when the Greely expedition disappeared into the Arctic wilds, and how for three long years tidings were listened for, which seemed as if they would never come, but finally they were rejoiced by the news that the relief expedition had found the party, reduced as it was from twenty-five to seven, Major Greely himself being among the living, though on the point of death. The expedition was the means of bringing together meteorological and magnetic observations which were of very great scientific interest. The marvellous privations undergone, and the great exertions made by Major Greely's party, showed what stuff our common kinship was made of.

Admiral Sir Leopold M'Clintock said that so eminent an explorer as Major Greely would be most heartily welcomed in any company of Englishmen, but more especially so by geographers, who knew what dangers he had passed through in the cause of geographical research, and what additions he had made to geographical knowledge. Major Greely was still in very delicate health; he had had to postpone the completion of his interesting narrative, and by the orders of his medical advisers he was about to go to the Mediterranean in search of health. He would carry with him the most sincere wishes of the Society for his safety and complete recovery, and all would hope that he might shortly be able to lead other expeditions into unknown geographical areas. It was a companion of Major Greely, the late lamented Lieut. Lockwood, who had made the nearest approach to the North Pole yet accomplished. Although we could not quite claim Major Greely as our countryman, it was a distinction with hardly a shade of difference. Such an adventurous explorer would be most heartily received by the Society, whether he came from the other side of the Atlantic or from within Temple Bar. He had given renewed proof that the Anglo-Saxon race still retained its spirit of adventure, equally on both sides of the Atlantic, and thus recalled the words of the heroic Gordon, who said that the English are a nation of adventurers, and that England owes her proud position among the nations of the world, to the adventurous spirit of her sons.

Major Greely said he was sure the meeting had not expected to be carried from the palms of the south to the willows of the north; they had met to hear a story rather of African than Arctic work; but since the noble President and Admiral M'Clintock had given him such words of welcome, he felt compelled to say a few words in acknowledgment. He appreciated very much the fact that he had

been introduced to the Society by their noble President, who, when he (Major Greely) sailed to the north, was the potentate who ruled over the largest number of square miles of ice and snow on the face of the globe. He thought Sir Leopold M'Clintock would agree with him that the greatest Arctic explorer was Sir William Parry, to whom the canon was due which underlay all successful Arctic work, that it could only be pursued for any considerable distance when a coast was found trending towards the north. The remarkable work which Parry did, and the canon he had laid down, caused him (Major Greely) to regard him as the father of modern Arctic work. But to Sir Leopold another not less important lesson was due, a lesson which Franklin had not learned, that a successful advance or retreat depended on laying out in the autumn elaborate depôts, by which the spring work was facilitated. He (Major Greely) felt that he owed very much to the greatest Geographical Society in the world. While devoting attention to geographical science, the Society had looked upon Arctic work as worthy to be pursued by the British sailor. As the result of their efforts came the great expedition of 1875–6, which did such excellent work within the Arctic Circle, and which it was his good fortune to follow. By their labours, successes, and faults, he learned lessons which enabled him to do his work when he went northward. To the President of the Society, to some of the Vice-Presidents and members, he wished to tender his thanks for many courtesies both at Montreal and in England, as well as to the audience that evening for the very cordial manner in which he had been received, and for the attentive manner in which he had been listened to.

Third Meeting, 14th December, 1885.—The Most Hon. the MARQUIS OF LORNE, K.T., President, in the Chair.

ELECTIONS.—*John Anderson, Esq.*, M.D.; *Colonel Matthew Bowie; James Butcher, Esq.; Major G. L. Cuming; Hubert Broomfield Grafton, Esq.; David J. Jardine, Esq.*, M.A.; *Captain George Henry Leggett; Arthur Macartnay, Esq.; Hugh P. Malet, Esq.; Frederick Hardyman Parker, Esq.; Frederick William Rolfe, Esq.; Rev. Charles A. S. Minton Senhouse; Rev. John Troutbeck*, D.D.; *G. N. Vickers, Esq.; Harold Athelstane White, Esq.*

PRESENTATION.—*J. G. Bickford, Esq.*

The following paper was read by the author:—

"The Herat Valley and the Persian Border, from the Hari-rud to Seistan." By Colonel C. E. Stewart.

The paper, with discussion and map, will be published in the February number of the 'Proceedings.'

Fourth (Special) Meeting, 21st December, 1885.—The Most Hon. the MARQUIS OF LORNE, K.T., President, in the Chair.

This meeting was called for the purpose of receiving Major A. W. Greely, U.S.A., and hearing from him an address on

"Arctic Exploration with reference to Grinnell Land."

Will be published, with the discussion which followed, in a subsequent number of the 'Proceedings.'

The hall was crowded in every part; among the audience were the following British Arctic officers and explorers:—

Admiral Sir Leopold M'Clintock, C.B.; Admiral Sir E. Inglefield, C.B.; Admiral Sir E. Ommanney, C.B.; Captain Sir Geo. Nares, K.C.B.; Captain A. H. Markham,

C.B.; Captain L. A. Beaumont, R.N.; Sir Allen Young, C.B.; Sir Alex. Armstrong, K.C.B.; Dr. John Rae; Mr. C. R. Markham, C.B.; C. E. Hodson (Chaplain to the *Discovery*); Major H. W. Feilden, R.N. (Naturalist to the *Alert*); Captain J. C. R. Colomb, R.M.; Mr. W. H. Neale (Surgeon, Leigh Smith Expedition); J. Lamont; W. J. A. Grant (of Mr. Leigh Smith's Expedition); Lieutenant George Le Clerc Egerton; Commander Conybeare; Commander Hull.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—November 6th, 1885: M. ALPH. MILNE-EDWARDS, of the Institute, in the Chair.—M. A. Germain, Vice-President, alluded to the loss that the Society had sustained by the death of M. Henri Milne-Edwards, one of the most eminent members of the Society. He briefly reviewed the scientific career of the learned biologist, dwelling more particularly on his extensive deep-sea researches, in which, he said, he was being followed by his son, the President of the Central Commission.—The Topographical Society of France sent the programme of an exhibition about to be held for the purpose of showing the application of the art of drawing to topography.—The Commercial Geographical Society of Nantes announced that the Eighth National Congress of the French Geographical Societies would be held in that town next year.—M. A. Chaigneau forwarded from Valparaiso reports of the expedition made in the interior by Commander Valverde for the Chilian Government, and sketches executed by a member of the expedition.—Dr. Broch forwarded a communication on the subject of the mountains of Swedish Lapland, embodying the results of the explorations and determinations made by M. Suenonius, the distinguished Swedish geologist, in that hitherto little known region. The highest peak is that of Kebnakaisa, situated in 68° latitude and 1·5° longitude E. of Stockholm, which is 7004 feet (2135 metres); the two next highest peaks are those of Kaskasatjakko and Sarjektjakko, both over 6800 feet high.—Letters had been received from M. Léon Dru, engineer, giving favourable reports as to the progress of his mission for uniting the Volga and the Don by means of a canal.—Col. Venukoff gave some information regarding the great Siberian Railway; the first portion had just been opened from Ekaterineburg to Kamychow; it would soon be continued to Tiumen, where the great water-way across Siberia commences. The works for piercing the isthmus between the Obi and Yenisei would be completed probably by the end of next year; communication had already been established by steamer along the Angara between the Yenisei and Lake Baikal. M. Daniloff, engineer of bridges, had discovered the point at which the Oxus formerly bifurcated, one branch, the Unguz, flowing into the Caspian, while the other, the Amu-daria, discharged into the Aral Sea. M. Venukoff announced the discovery of extensive sulphur deposits in the Transcaspian deserts, which would be utilised by the Russian Government. He also announced that the Geographical Society of Russia was about to send an expedition, under the command of M. Radde, to southern Turcomania and the neighbouring part of Khorasan.—M. G. Baudens forwarded from Haiphong (Tongking) a paper giving his explorations of a portion of the Black river: he appears to be favourably impressed with this part of the country.—In a letter dated 16th August from Cayenne, M. Rouzioux informed the Society that on 4th August an earthquake was experienced at that town; the shock, which lasted about one minute, was the most serious ever felt there.—The Minister of Public Instruction transmitted, on behalf of the Minister for Foreign Affairs, a despatch from the French Chargé d'Affaires at Buenos Ayres with reference to the mission of M. Thouar

in Gran Chaco. From their report, and letters received from M. Thouar himself, it appears that he has been well supported in his proposed expedition by the Argentine Government; he had just started with a picked escort of twenty-five men up the Pilcomayo to further prosecute his explorations in connection with the means of communication between Bolivia and the Argentine Republic.—M. Brau de St. Pol Lias, writing from Buitenzorg (Java) on 12th August, corrected the report that the volcano Krakatoa has again become active; two other volcanoes, viz. Lamongan and Semiru, are in eruption, but Krakatoa itself remains inactive.—M. H. Duveyrier made a statement of considerable importance with reference to the protectorate proclaimed some time ago by Spain over the African coast from Cape Bojador to Cape Blanc. From a publication made by the Geographical Society of Madrid, it would appear that a portion of territory along the Bay of Levrier, which formerly belonged to France, has been represented in this document as belonging to Spain. M. Duveyrier showed that this territory really belonged to France; and it was resolved that the attention of the Geographical Society of Madrid should be called to the fact.—In conclusion, M. Chaffanjon gave an account of his explorations on the Orinoco.

——— November 11th, 1885: M. Ferdinand de Lesseps, President of the Society, in the Chair.—This was a special meeting held in the Sorbonne Hall to receive the two Portuguese travellers MM. Capello and Ivens on their return from their important journey across the southern part of the African continent. Among the distinguished persons present the following may be mentioned: M. de Andrade Corvo, Portuguese Minister at Paris, M. de Laboulaye, French Minister at Lisbon, M. de Montholon, representing the Foreign Office, MM. A. Germain, de Faria, de Quatrefages, Dr. Bayol, Prince Roland Bonaparte, &c. M. Ferd. de Lesseps opened the meeting with a graceful speech, giving a cordial welcome to the two famous travellers, and referring in eulogistic terms to the important work they had accomplished. M. Ivens then gave an account of the journey made by him and his companion across Africa from Mossamedes to Quilimane.* The Chairman, after the reading of the paper, tendered the thanks of the Society to the two travellers, and expressed his desire that the cordial relations existing between France and Portugal would continue to exist. In conclusion, M. de Andrade Corvo, the Portuguese Minister at Paris, thanked the Chairman and the Society for the reception accorded to the Portuguese travellers.

——— November 20th, 1885: M. Alph. Milne-Edwards in the Chair.—The Chairman announced the return to France of M. S. de Brazza, who arrived in Paris on 18th of November, and stated that a special meeting of the Society would be held in his honour. M. Himly, Vice-President, referred to the importance of the work accomplished by the distinguished explorer. In the course of the meeting M. de Brazza came into the hall and received an enthusiastic welcome from the audience. —The Geographical Service of the Army forwarded through the Minister for War a proof copy of the map of Madagascar, on the scale 1:2,000,000. A revised edition of the 'Guide hygiénique et médical du voyageur dans l'Afrique centrale' was among the works presented. The General Secretary drew attention to the importance of this book in connection with African travel.—M. R. du Caillaud sent a copy of a communication addressed by him to a Chinese diplomatist, on the Burmese question and English acquisitiveness on the west of Yunnan.—M. Alph. Pinart forwarded some information contained in a letter addressed to him by Abbé F. Midon from Yokohama, on the Ainos of Yezo, who are gradually becoming amalgamated with the Japanese. The native language of the Ainos, says the correspondent,

* See 'Proceedings R. G. S.,' vol. vii. 1885, p. 818.

appears to have completely disappeared.—Letters were read from M. Fourneau on the basin of the Ogowé.—M. Ramon Lista sent some information concerning the geographical map published by him as the result of his journey in Central Patagonia. The details of this exploration would be found in the Italian periodical 'Cosmos.'—M. Foncin made some statements with regard to the alleged gradual disuse of the French language in Switzerland, and quoted statistics from the 'Alliance Française' which he regarded as favourable for the future of the French tongue in Switzerland.—M. Duveyrier stated that he had just made a correct barometrical determination of the altitude of Fez (Morocco), which was not known before. The result, which had been tested by M. Renou, was 1154 feet (352 metres).—An interesting discussion was opened by M. Coudreau on the territory in dispute between France and Brazil on the borders of French Guiana. In 1856 Brazil offered France one-half of this tract of country, which is situated between French Guiana and Para, but France claimed two-thirds. After dealing very fully with the origin of the dispute and the means of settling it, M. Coudreau dwelt upon the suitability of the country as a field for colonisation and increased commerce. M. Levasseur, of the Institute, said he did not consider that the amicable relations now existing between the two countries should be disturbed for the sake of a tract of country which, he was convinced, could not be colonised to any extent by Europeans. In conclusion, M. Coudreau replied that the present occasion was favourable for a settlement of the dispute.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Mainof, Vladimir.—Ocherk yuridicheskago biita Mordvii.—Sketch of the Juridical Customs of the Mordva. St. Petersburg, 1885: pp. x. and 267.

This volume forms the first part of vol. xiv. of the *Zapiski* of the Ethnographical Section of the Imperial Russian Geographical Society. It is an interesting ethnological study of a people of Finnish race inhabiting parts of the Volga riverine districts, and shows the influence exercised upon them by their Russian and Tartar neighbours. This is especially noticeable in their marriage customs. The old heathen rape of the bride is no longer a frequent practice among them, and the authority of the parents is more usually recognised.

Another work of a kindred nature, forming part i. of vol. xiii. of the same series (Ethnographical), is—

Vollant, G. A.—Ugro-Russkiya naródniya pésni.—A Collection of Ugro-Russian Songs. St. Petersburg, 1885: pp. 261, with ethnographical map of Hungary.

This work contains 525 popular songs of the Ugro-Russ. By this name, M. de Vollant explains, he refers to the inhabitants and country of the Carpathian Mountains, who call themselves Russ, and are admitted to belong to this nationality by unprejudiced savants. They are the *Rutheni* of mediæval writers, and their language and customs have already attracted a good deal of attention among literary men, to whom this recent contribution will doubtless be welcome.—[**E. D. M.**]

AFRICA.

Moraes, J. A. da Cunha.—Africa Occidental, Album Photographico e Descriptivo. Com uma Introducção de Luciano Cordeiro.—Western Africa, Photographic

and Descriptive Album, with Introduction by Luciano Cordeiro, and Map of the Lower Congo. Part I. Presented by the author.

This is an album of photo-lithographs taken in South-western Africa, including Landana, Banana, Ambriz, and Ambrizette on the coast, the rivers Congo and Kwilu (Quillo). The views are well chosen, and represent the scenery, the vegetation, types of natives, and the European trading settlements. Each plate is accompanied by a few lines of descriptive text, and the album is well calculated to give a stay-at-home inquirer a faithful idea of a country which has lately been the subject of so much public interest, in the neighbourhood of the Congo, as well as the scenery of the great river itself—a welcome addition to our knowledge of the dark continent. The view of the Yellala appears to be taken above the fall, and not quite near enough to give an idea of the prodigious force and volume of the waters as seen from below. Three more volumes are promised.—**[E. D. M.]**

Wauters, A. J.—Le Congo au point de vue économique. Bruxelles, Institut National de Géographie, 1885: 8vo., pp. xiv. and 256. Price 3*s*. (*Trübner.*)

This volume belongs to the same series as that of Colonel Wouvermans. It is a compilation on the resources of the Congo region and of Central Africa generally, based on the accounts of the many travellers who have visited Central Africa, and the reports of the employés of the Free State. The author gives a geographical account of the Congo State and neighbouring regions; its populations; climate; natural resources; its markets, commerce, and industry; the organisation of the State; while an appendix contains the *Acte Général* of the Berlin Conference. We need scarcely say that M. Wauters takes a sanguine view of the capabilities of the Free State, though his compilation may be useful for reference. There are eight illustrations and three maps—Banana and the entrance to its creek, 1:25,000; the Congo between Banana and Manyanga, 1:15,000,000; and a political map of Central Africa, 1:10,000,000.

Wouvermans, [Colonel] H.—Libéria, Histoire de la Fondation d'un état nègre libre. Bruxelles, Institut National de Géographie, 1885. Price 3*s*. (*Trubner.*)

This volume was originally prepared as a paper to be read at the Antwerp Geographical Society. Colonel Wouvermans was annoyed at the doubts and calumnies with reference to the forming of a free state on the Congo, and in order to show what negroes are capable of accomplishing, he wrote the memoir which has been expanded into this volume. The memoir itself has had the benefit of official revision in Liberia, and Liberian statesmen, the author informs us, express themselves gratified with Colonel Wouvermans' account of their country and its history. We need scarcely say, then, that the Colonel presents a somewhat rosy picture of the negro state. He speaks of the difficulty of getting satisfactory information concerning the country and its history; and he has therefore done a service in bringing together in a handy volume a digest of all existing information. After a somewhat long introduction he devotes a chapter to a geographical description of the Grain Coast, and in succeeding chapters gives a history of the State from its beginning as a colony in 1820 down to 1871. He refers to subsequent boundary treaties with the natives and with Great Britain, and displays some animus against the latter. One chapter is devoted to manners, customs, commerce, and industry. While the volume is serviceable, it should be used with caution. There are two maps, one of the north-west frontier of Liberia, with inset map of the Cape Mount district, and the other of the whole country, on a scale of 1:2,000,000, with an inset of the district of Monrovia.

ASIA.

Fuss, V.—Resultati Sibirskoi nivellirofki proizvedénnoi, v 1875–1876, ot stanítsi Zverinogolofskoi do ozera Baikala. Results of the Siberian levelling executed in 1875–1876, from the station of Zvérinogolof to Lake Baikal. Pp. 44.

☞ This work was undertaken at the suggestion of the Physical Section of the Imperial Russian Geographical Society, a committee having reported in favour

of it. Funds were provided partly by private persons, among whom the well-known M. Sidorof gave 4000 rubles. The mode of levelling was that called the Swiss method, first tried by the Russians in their recent levellings of the steppe between the Sea of Aral and the Caspian. Three sections of route with map showing the line traversed from Omsk to a little beyond Irkutsk illustrate the work.—[**E. D. M.**]

Montano, [Dr.] J.—Voyage aux Philippines et en Malaisie. Paris, Hachette, 1886: pp. viii. and 351. Price 4*s.* (*Dulau.*)

This is a very welcome addition to our knowledge of an interesting island group, of some of which we know but little. Dr. Montano and Dr. Rey were commissioned by the French Minister of Public Instruction to undertake a scientific mission to the Philippines, and this volume is an abstract of the daily notes taken by the former. The visit lasted for two years, during which Dr. Montano visited several parts of Luzon, the island of Panay, Mindanao, Baulan, the Sulus, Palawan, and North Borneo. In connection with his visit to Balanga, the author has some useful notes on the Negrito inhabitants, partly the result of his own observations and partly of information derived from a resident Spaniard. Some time was spent at Albay, in the south of Luzon, and we have much information on the economic condition of the province, its inhabitants, and its physical geography. The visit to Sulu is also of interest. Dr. Montano had an interview with the Sultan, who graciously permitted himself to be photographed, and the result appears as one of the many beautiful illustrations in the volume. The visit to the Gulf of Davao, in the south of Mindanao, gave the author the opportunity of seeing a good deal of the interesting natives of this region, and also of ascending the Apo volcano, and accomplishing the rarely attempted and somewhat difficult feat of crossing the island northwards to the Bay of Butuan. The information thus obtained as to the interior of the island is of much value. The map, though well executed, is too small—1 : 1,500,000.

Schperck, Franz.—Rossíya dáilnago vostóka.—Russia of the Distant East. St. Petersburg, 1885: pp. iii. and 503.

This work, published as vol. xiv. of the *Zapiski* of the Imperial Russian Geographical Society, is an exhaustive treatise on the Russian possessions on the Amur—a name, by the way, corrupted from the Mongol Ta-muren (great river). The author, who had resided ten years in the Amur province, studied the literature on the subject, of which he gives a list in his introductory remarks, and was thus enabled to write a more complete work on a country concerning which but little is known in Europe. He divides his subject into six parts: 1. History; 2. Topography and Geology; 3. Hydrography; 4. Climate; 5. Flora and Fauna; and 6. Ethnography and Biology. Chapter 6 is accompanied by tables giving statistics of the population. These show the number of inhabitants to be very small: in 1879, the last year for which returns are given, the number of both sexes was only 37,052 in the province, including the town of Blagoveschensk, and the rate of increase 1·2 per cent.—[**E. D. M.**]

OCEANIA.

Monnier, Marcel.—Un Printemps sur le Pacifique. Isles Hawaii. Paris, Plon, 1885: 8vo., pp. 269. Price 4*s.* (*Dulau.*)

This is a sketchy book, and adds little to what we already know of the Hawaiian Islands and their people, from the works of several able travellers. M. Monnier visited the islands in 1884, and writes an amusing account of what he saw and heard, gives some picturesque descriptions of the striking scenery, and sketches of social life. He visited all the large islands except Kaui, and made a pilgrimage to Kilauea, but has nothing new to tell us. There are some nice illustrations and a small map of the islands.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

ARCTIC REGIONS.

Baffin Land zur Darstellung der Verbreitung der Eskimostämme. Unter Benutzung der neueren Arbeiten von Hall, Schwatka und der Deutschen Polarstation zu Kingua, einer älteren Arrowsmithschen Karte, handschriftlichen Mitteilungen, v. Captain Spicer & Keeney, sowie eigener Aufnahme und Erkundigungen entworfen von Dr. Franz Boas. Scale 1 : 6,000,000 or 82·1 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 80, Tafel 2. Justus Perthes, Gotha, 1885. (*Dulau.*)

Cumberland-Sundes.—Karte des —— und der Cumberland-Halbinsel. Nach eigenen Aufnahmen und Erkundigungen in den Jahren 1883 u. 1884, und unter Mitbenutzung der Vermessungen der Deutschen Polarstation von Kingua, von Dr. Franz Boas. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 80, Tafel 1. Justus Perthes, Gotha, 1885. (*Dulau.*)

EUROPE.

Balkan-Halbinsel.—Karte der ——, und der angrenzenden Gebiete. Nach den neuesten Quellen bearbeitet, von G. Freytag. Scale 1 : 1,600,000. Mit 7 Ansichten in Holzschnitt. Wien, Hartleben. Price 1*s.* (*Dulau.*)

Bosnien und der Hercegovina.—General-Karte von ——. Scale 1 : 150,000 or 2 geographical miles to an inch. Aus den Cadastral-Aufnahmen und den Terrainskizzen der Geometer reducirt und gezeichnet von den Unterdirektoren der Vermessungs-Abtheilungen. Blatt 1. Bihac, Bos, Kostajnica und Sanski-Most. 5. Kulen-Vakuf, Petrovac, und Kljuc. 7. Doboj, Zepce, und Dl. Tuzla. 11. Zenica Kladanj und Sarajevo. 12. Vlasenica, Srebrenica, Visegrad und Rogatica. 14. Konjica, Foca und Nevesinje. 15. Gorazda und Cajnica. Wien. 2*s.* each sheet. (*Dulau.*)

Europäischen Turkei.—Karte der ——, und der Balkan-Staaten, von W. Liebenow. Scale 1 : 1,250,000 or 17·1 geographical miles to an inch. Berlin, Lithograph. Institut. Price 1*s.* 6*d.* (*Dulau.*)

Griechenland.—General-Karte des Königreiches ——. Scale 1 : 300,000, or 4·1 geographical miles to an inch. Nach Berichtigungs-Daten des k. griech. Oberstlieutenants J. Kokides und revidirt von Prof. Dr. H. Kiepert. Bearbeitet und herausgegeben vom K. K. militär-geographischen Institut in Wien, 1885. 11 Blatt und 2 Klappen. Price 18*s.* (*Dulau.*)

The want of a good map of Greece has long been felt, those already published are for the most part, though compiled with care, drawn on scales too small for anything but the purposes of general reference, and in most cases they have formed only a portion of maps of a more extended area, such as those lately published of the Balkan Peninsula, or the still older maps of Central Europe. In the map under consideration the scale is sufficiently large to enable the individual features of each district to be studied, and to identify the extent of each nomarchy or eparchy, as their boundaries are clearly laid down. The hill-shading is effective, the main triangulation stations are indicated, and the heights of numerous stations are given in metres. The country belonging to neighbouring States is drawn in outline only, the roads, rivers, and principal towns being shown. A note containing an explanation of the system of orthography employed with reference to the Greek and Turkish nomenclature, and a table of signs and abbreviations will be found on sheet V. The routes

followed by passenger steamers, and their ports of call, are laid down, as well as all lines of submarine telegraphic communication. At the present time, when so much attention is directed to Greece, in connection with the Eastern Question, the publication of this excellent map has been most opportune.

Serbien.—Generalkarte des Königreiches ——, mit den angrenzenden Gebieten von Bulgarien, Bosnien, sowie mit Theilen der anstossenden turkischen Vilajets. Bearbeitung von A. Steinhauser. Wien, Artaria & Co. Price 3*s*. (*Dulau.*)

Westfalen und Hessen.—Karte der Rhein-Provinz, von H. Kiepert. Scale 1 : 750,000 or 10·3 geographical miles to an inch. Berlin, D. Reimer. Price 1*s*. (*Dulau.*)

Westharzes.—Geologische Karte der ——. Scale 1 : 25,000 or 2·9 inches to a geographical mile. 2 Blätter. Clausthal, Uppenborn. Price 10*s*. (*Dulau.*)

AFRICA.

Afrika.—Spezial-karte von ——, im Maasstab von 1 : 4,000,000 or 55·5 geographical miles to an inch. (10 Blatt.) entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domann und Dr. Richard Lüddecke. III. Lieferung. Inhalt: Sektion Central-Sahara (2) nebst Bemerkungen von B. Domann. Sektion Congo (7) nebst Bemerkungen von H. Habenicht. Die Karte erscheint in 5 Lieferungen (jede mit 2 Karten) à 3 Mark (3 shillings). Alle 4 bis 6 Wochen erscheint eine Lieferung. Gotha, Justus Perthes, 1885. (*Dulau.*)

This map is being so promptly published that there now remain only two parts to complete it. No higher praise can be bestowed on the two maps in the present issue, than to say that they are in keeping with the sheets already published, and that they accurately exhibit the present state of our geographical knowledge in the Central Sahara and the Congo district.

Somali Halbinsel.—Josef Menges' Reisen auf das Hochplateau der ——, im Januar und Dezember 1884. Nach den Itineraraufnahmen des Reisenden autographiert von C. Schmidt. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1885, Tafel 20. Justus Perthes, Gotha. (*Dulau.*)

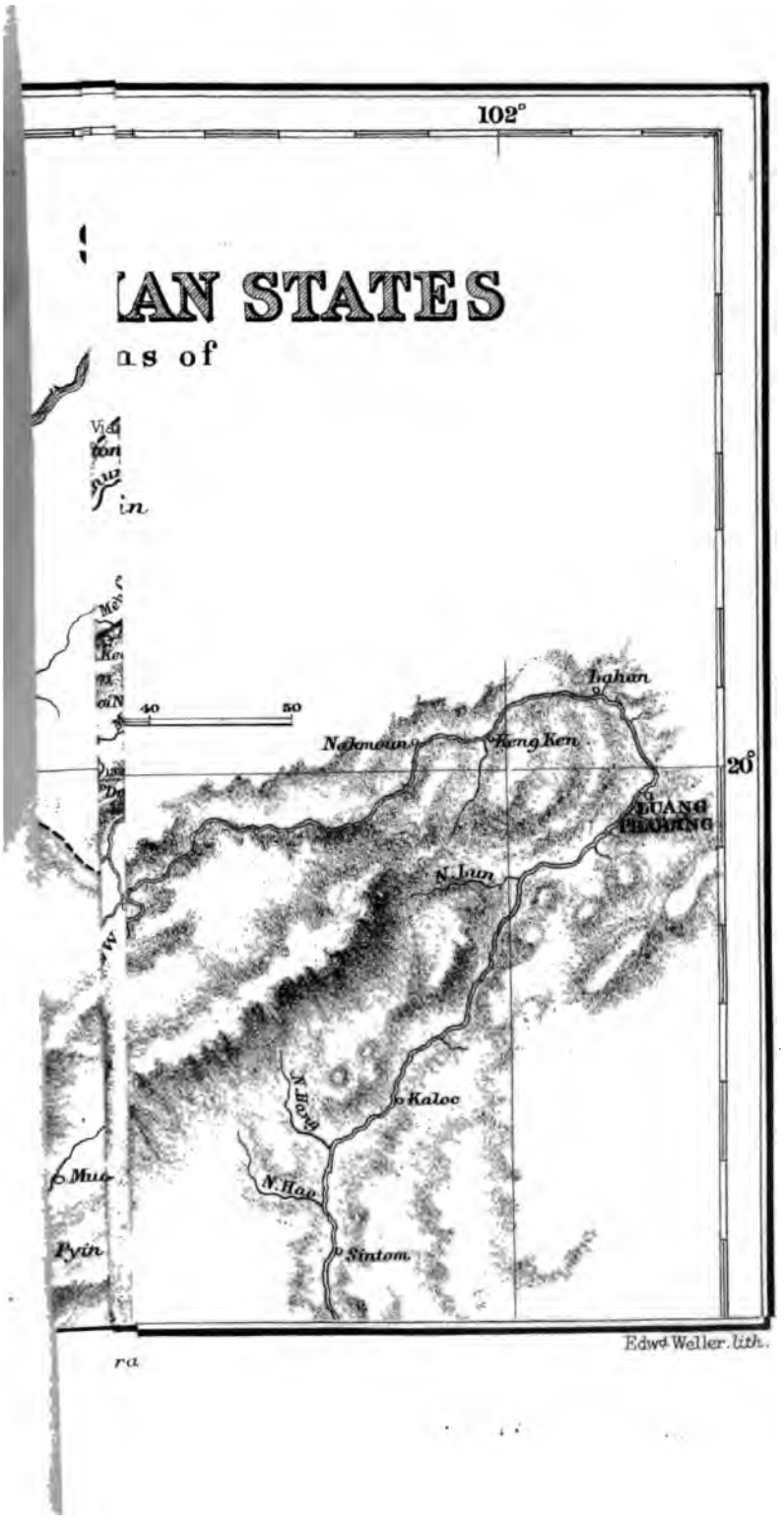
AMERICA.

New Brunswick.—Map of the Province of ——, Canada. Compiled and drawn from the existing publications of the Geological Survey of Canada, the Admiralty Surveys, and the Official Plans in the Crown Land Office, by Thos. G. Loggie, Surveyor-General's Office, Fredericton, N.B., 1885. Scale 1 : 254,040 or 3·5 geographical miles to an inch. Published by J. & A. M'Millan, St. John, N.B. Lithographed by W. & A. K. Johnston, Edinburgh and London. 6 sheets.

This is an excellent general map of the Province of New Brunswick, on which railways, roads, townships, and all means of communication are shown, as well as the boundaries of counties and parishes. One of the principal features of this map is the manner in which the geological formations are indicated by letters, and not by the more common method of tints, and shades of colour, which might in the present instance lead to confusion. The scale, three geographical miles to an inch, is sufficiently large to make this map extremely useful for general reference, and special care appears to have been taken in laying down the geological boundaries.

Niagara-Falle und Umgebung.—Special Karte und Ansicht der ——, nach den neuesten topograph. Aufnahmen bearbeitet von L. Deichmann. Scale 1 : 300,000 or 4·1 geographical miles to an inch. Kassel, Deichmann. Price 1*s*. (*Dulau.*)

Uruguay.—Mapa de la Republica Oriental de ——. Scale 1 : 680,000 or 9·3 geographical miles to an inch. With special plans of Montevideo, Maldonado, Colonia, and Marin Garcia. 2 sheets. Montevideo. Price 16*s*. (*Dulau.*)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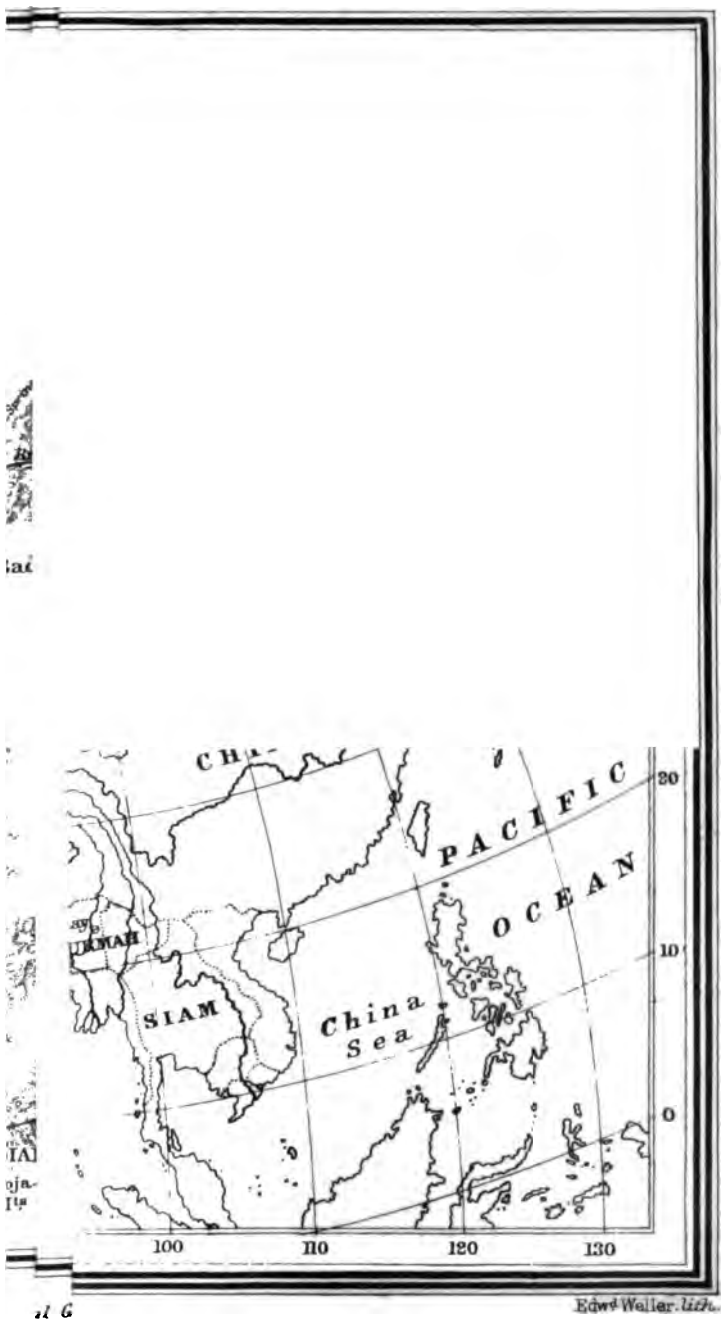
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A Journey from Cape Town overland to Lake Nyassa.

By W. Montagu Kerr, C.E.

(Read at the Evening Meeting, November 30th, 1885.)

Map, p. 136.

In the autumn of the year 1883 I sailed from England for South Africa with a view to satisfy a long cherished wish, namely, the exploration of African lands as yet little known, and more particularly to study the character, habits, and customs of the negro races.

Arriving at the Cape, I made all inquiries from the most reliable sources as to the probabilities of my success in accomplishing a journey alone overland to Central Africa. I did not get much encouragement, but, nevertheless, finally determined to make the attempt (whatever might be the results) to reach the Lake regions of Central Africa, and from thence to proceed towards the sea.

I will now endeavour to explain how I got there and describe the chief features, geographical and ethnological, that fell within the range of my observations.

Starting from the Cape I passed through the Orange River Free State and the Diamond Fields, and under the hospitable roof of Mr. J. Leask, at Klerksdorp, in the Transvaal, I found Mr. Selous, the well-known hunter and traveller, to whom I soon made my plans known. He thought that the principal opposition to my scheme of exploration to the far north-east of Matabeli-land would be given by the powerful and despotic ruler of that country, Lo Bengula, whose suspicions might be aroused by a traveller wishing to go through his country without asking permission to hunt ivory or to search for gold. As it would have taken a considerable time for me to have fitted out a wagon and oxen at this place, and in prospect of such a trip as I was about to make—it being most important to reach the Zambesi river before the rains which would set in about October—Mr. Selous very kindly offered me a berth in his wagon. The next few days were occupied in

loading the wagons with all sorts of provisions, also cloth and beads for purposes of exchange. Then we were ready for the start, with sixteen oxen yoked to each wagon, about fifty sheep, dogs, hunting ("salted") horses, and a large number of cows and calves, a few black savages of different types; Selous and myself completed the typical South African caravan. On the morning of the 5th of March, 1884, we left Klerksdorp. Heading towards the north, we passed through the great waving grassy plains of the Northern Transvaal with their varying tints of colour, and reached the town of Lichtenberg. By the action of the atmosphere, tropical rains, and human neglect, this town is fast becoming a ruin, as indeed is also the case in many other places in the Transvaal, where money as a medium of exchange is almost unknown, since the evacuation of the English in 1881. The traveller cannot but be impressed by the excessive poverty, utter loneliness, and want of trade, all due to the absence of vigorous life in these small centres of civilisation in the Transvaal.

The next few weeks we trekked onwards amidst torrents of rain, the wagon wheels sometimes sinking up to the naves into the black and treacherous veldt, until we reached the borders of Bechuanaland, crossing the head-waters of the Marico river, an affluent of the Limpopo. Thence for three weeks we journeyed through the heavy sand-belts of Northern Bechuanaland, the country of the Bahurutsis and King Sechele, who was once converted to Christianity by Livingstone, but who has since returned in a great measure to his former habits. On the morning of the 5th of April we arrived in Khama's Town, the so-called King of the Bechuana people. The town is situated at the foot of a range of black basaltic mountains, and for years has been a great trading centre. Thousands of giraffe, leopard, lion, and other skins are sent from here every year to Natal and the south, the karosses being the finest produced in Southern Africa.

On the 6th, we left Khama's Town, and taking a north-easterly course crossed the great sandy beds of the Mahalapse, Serube, and Shasha rivers, all affluents of the Limpopo, draining a country clad with thick bush and forest. We reached the Tati Gold fields in Southern Matabeliland on Easter Sunday morning, and were welcomed to a good dinner by the Jesuit Fathers, who have a small station there.

Though our stay was very short, I had time to see all that was to be seen of the limited workings of the mines thus far open. The veins are small and irregular. The auriferous quartz is of a rather low grade and somewhat coloured with peroxide of iron. The country rock is composed of slate. For general prospecting purposes this country is not very promising, owing to a deposit of gravelly soil covering the underlying croppings of the veins, and thus rendering them difficult of discovery. Hitherto the only guides to white prospectors have been the excavations made in bygone years by the Mashona people (Amasuina), a

persecuted race driven by the cruel hand of fate far to the north-east of Matabeli-land.

Leaving Tati we pushed on, passing numerous granite hills, with their strange fantastic forms peering prominently up out of the dense forest, and traversed a much more picturesque country, crossing rivers such as the Ramaqueban, the Inkwezi, Mangue, Simokwe, and Shashani, all carrying more water than the rivers we had previously passed. We were now rising on the southern slopes of the great granitic mountains, which form the divide between the waters flowing to the Limpopo, the Sabia and the Zambesi. The road passes over an elevation of about 4300 feet above sea-level, and we had now reached the great plateau of Matabeli-land. We passed through a number of villages, between which were interspersed fields of maize. This district seemed to be thickly inhabited. We were approaching Gubuluwayo, the town of the great monarch Lo Bengula, the most powerful king in South Africa. Crowds of his people (of Zulu origin) flocked round the wagon offering produce and tobacco in exchange for cloth. They escorted us till we reached the house of Mr. George Fairbairn, a Scotch gentleman who trades in ivory, close to the king's kraal on the southern banks of the Umkhosi river.

Lo Bengula was suffering from gout, doubtless through over indulgence in native beer. However I paid him a visit, and was received in a savagely courteous manner. Seated on the ground beside him we drank the beer given us by the pretty slave girls and ate the chunks of beef handed to us by the royal fork of his majesty. A walk through the royal harem, teeming with slaves of all sexes and sizes, unfolded novel scenes. The queens luxuriated on the grass or cane mats before their beehive-shaped huts, basking their fat and voluptuous bodies like seals in the sun. These queens were a very happy looking group, good nature beaming out on every line of their deep-brown countenances. The huts were the best constructed and the cleanest I had seen.

The town of Gubuluwayo is situated on the outer side of a great elliptic inclosure of about half a mile in length, the centre of which is entirely occupied by royalty and their belongings.

Once a year a grand dance takes place, which is considered the finest and most martial sight in South Africa. At least 6000 warriors, decked in ostrich-feather capes and otter-skin turbans and armed with assegais and shields, dance, feast all together, and sing the song of the assegai and the praises of their great king.

Some days passed before I again visited Lo Bengula, but I approached him with a strong hand, presenting him with a sword-knife and the promise of a fine bull. He said, "You can go through my country, but it is very far to the Zambesi." Thanking, I bid him good-bye. He said, "Go well, son of the sea."

There is much to be said about this interesting and warlike people, but the limit of this paper will not admit of much detail.

Doubts and fears being now dispelled by the courtesy of Lo Bengula, I busied myself during the following days in preparing to leave, while my good friend Selous left on a hunting trip for the Mababe and Chobe river, which lie about two months' travel to the far west. I hired a cart of very small dimensions and six oxen. I loaded it with provisions, rifles, and ammunition, not forgetting cloth and beads, the necessary articles of exchange, and by the end of May bid adieu to my kind white friends. Passing through the pretty grounds of Mr. Thomas (whose generous assistance I can never forget), called Shiloh, with its beautiful banana and lemon trees and orange groves, then through the Mission station of the London Missionary Society at Umhlangene, we camped, as the sun was sinking in the west, in a forest-bound plain, by a small vlei of clear water.

My party now consisted of Korana John, a Makololo, a Makalaka, a Mashona, and a Bushman, the latter a very extraordinary looking individual of very low type; his fancies of dress lay entirely in the line of head-ornaments, as he adorned his wonderfully shaped cranium with all sorts of articles, feathers, and other curiosities. My party was small, but I had learned that to take a following of Matabeli people would be fatal to success and dangerous, as they were constantly at war with their neighbours. The rain seemed fairly to have passed over, and we trekked onward, favoured with very clear fine weather, the thermometer registering on an average 56° at sunrise, and in the day from 75° to 85° in the shade. For twenty days we held the great granitic range on our right in a general course of north-east, crossing the well-watered rivers Changani, Sepaque, Umnyati, Umsweswe, Umvuli, all feeders of the Zambesi, some of which we had great difficulty in crossing, the previous rains having left the high banks almost perpendicular. Our way lay through a somewhat interesting country of great forests of mopani and machabele, traversed by belts of yellow waving grass, the home of vast herds of antelope and many species of larger game such as elephant, rhinoceros, and other varieties. These animals are found in far greater abundance in the tsetse fly country some miles to the west of our track. Finally we arrived at one of Mr. Selous' deserted hunting camps on the southern banks of Hanyane river, and to my delight found a regular garden of pumpkins growing amid the wild grass.

We were now on the borders of Mashona-land. Striking across to the eastward over waving belts of open country with avenues of low trees lining the small watercourses—a land admirably adapted to farming, and well watered—we reached the rocky fastnesses of a Mashona chief, by name Chibero, overlooking a lovely green valley in which a few cattle were browsing. Here the people flocked out to meet us. From every rock there seemed to spring a living form. I was glad to see a strange face, for since leaving the mission station of Umhlangene, nearly a month ago,

we had not seen a soul. The people were very friendly, and all eager to get either beads or cloth. They are a very different type from the Matabeli, of whom they live in constant dread. They are of inferior physique to the Matabeli; their skin is darker, and they resemble the negro more. Their hair, which is curly and crisp, they dress into all sorts of tasteful shapes, using a piece of pointed bone to separate it, and tying it up in small tufts with the fine bark of the mimosa tree. They anoint the head with the fat of a sheep or wild animal, sometimes using the oil of the ground-nut, giving a shiny appearance to the whole, which resembles a bunch of ripe blackberries. They file between the two front teeth, making an opening in the shape of the letter Λ. The women shave their heads. Their weapons are the bow and arrow, the axe and assegai, of which latter every man carries two or three, of various sizes, but as a rule much larger than those used by the Zulus, and broader in the blade. They are a persecuted and hunted race, a people of the mountain fastnesses. Their towns occupy the most inaccessible spots in the great igneous belts which form so prominent a characteristic of their country.

The huts are very primitive in construction, thatched with wild coarse grass, and perched on the top of isolated rocks; the only means of entrance and exit being either up a pole or through many intricate windings in the adjacent rocks. Their principal diet is maize-meal or ground-nuts. Of the latter they are particularly fond. They are partial to meat of all descriptions, and are not at all particular as to the time it has been killed, providing it has not assumed entirely another form of life.

Their cattle are of a very diminutive size, and these timid people as night draws near herd them all into town, the nimble-footed beasts scrambling up the rocky and narrow paths with wonderful ease and confidence, and before the sun is set the gate is barricaded with trunks of trees.

We trekked on to Little Unyamwenda, where we abandoned the wagons. After an enormous amount of talk and trouble of the most trying kind, we packed our things for a start, making them into about twenty-five small portable bundles, as from this point our entire journey was to be pursued on foot. I left the wagon in charge of a petty chief, or rather headman, of old Unyamwenda, who lived at the next village. I had a good supply of cloth and beads. We left on the afternoon of the 21st of June with about thirty-three regulars, as I had anticipated desertion, and an enormous rabble of nude creatures of all sorts and sizes; they did not follow far, as two miles brought us to the Hanyane river, which we had to ford, and the crowd being averse to getting wet, left us; reaching Unyamwenda's town, we camped amid gigantic rocks. We had not gone far before I was able to detect in my party the decided elements of antagonism to my scheme of reaching the Zambesi river. That night I saw a glorious prairie fire. Perched on the top of an

immense boulder of granite higher than the highest Mashona hut, and at least 500 feet above the level of the plain beneath, I looked out on one vast sea of fire and smoke, hissing and crackling as it swept along driven by a regular hurricane.

Morning dawned, and as I had anticipated, roll call showed an extraordinary reduction in my party, so I lost no time in making the necessary overtures to a crowd of Mashonas, who were eyeing in a most avaricious manner some white calico that lay beside me.

Just before starting, the old chief Unyamwenda visited me; he was very dirty, and besides a small skin covering his shoulders, a very small skin sporan formed his sole attire. He presented a curious spectacle. Sitting on a block of granite, his face was one of surprise and injured dignity. I judged that he was impressed with the idea that the white man had treated him with too much levity, as I had not sent him a present in advance of my arrival in his town. He was a regular specimen of smoke-dried, well-cured humanity; his back resembling a side of corned beef, the skin literally baked, for it is the habit of these people to sleep with their skin exposed to large fires, which has the effect in many cases of entirely destroying the epidermis and disfiguring their bodies. He had not recovered his equilibrium of mind when I left, but looked exceedingly cross.

Descending from our rocky camp into the great plain, everything smelt of fire. As I looked through the heavy smoking mist that hung over the smouldering wastes it had a very depressing effect on the spirits. The great level wilderness assumed the appearance of an Indian shawl on a very large scale, the yellowish brown grass encircling the black, forming one huge pattern caused by the freaks of the wind and the varying moisture of the grass. Now we steered in a more northerly direction. In spite of my protestations, which were indeed empty words to these people, they would not veer from their course, so we wandered over vast undulating plains and bald hills very sparsely dotted with scraggy upland trees, crossing numerous rivulets, running their westward course to the Hanyane river. The nights were spent in the wildest singing and dancing and gorging of meat. At last we reached the town of Mchesa, a Mashona chief and a great blacksmith, who after much coaxing in the way of presents, agreed to follow me to my camp by the river Waynge, which wends its zigzag course through hard black basaltic rock. In this snug spot, surrounded by precipitous walls of rock, grave troubles were destined to arise. With very primitive tools the old chief made a number of assegais; appearing to great advantage and showing himself to be a thorough tradesman, of which fact he seemed to be fully aware. My Unyamwenda men here refused to proceed, and at this point the expedition was threatened with annihilation. Days passed, and each day, almost every hour, was full of incident. I had been deserted and wandered far away from

my party. Once more, however, with a fresh crew and guide we were *en route* for the north; trending our way through a hilly country with few trees, crossing the head-waters of the Ruia river, which runs eastward on its course to the Amazoe river, and forms one of its principal tributaries, draining a large area of country. We traversed the plains beyond, in which detached walls of granite shoot up high above the level of the land, through marsh and belts of luxuriant forest which clothe the banks of the rivers. Hartebeest, eland, zebra, and other fleet-footed fauna inhabit this region. Rising on the great eastern slopes of the Umvukwe range of mountains, which tower to 5000 feet above the sea, we traversed the head-waters of the Umzengezo river, one of the largest affluents of the Zambesi, and crossed the divide. In the far distant north we could see a very prominent mountain standing out boldly against the clear blue sky. My guide told me that the town of a great chief called Chuzu lay there. Reports were current that he was a bad man, that he would kill white men, that already the Portuguese had been fighting with him from the Zambesi. Two Mashonas whom we met on the banks of the Karue river also warned me not to go. Notwithstanding constant reports of danger, we proceeded, and on the evening of the 3rd of July, we were at the foot of the mountain stronghold, and with the wildest shouts that we wished to buy food (the customary way of these people advancing to a town) which echoed again and again amid the great rocks, we skirted round the mountain and camped on the further side of a small river close by.

The following morning crowds of men surrounded our camp armed with flintlocks (old Tower muskets) and spears. Just as I returned from an eland hunt (for without meat I could do nothing with my followers) I was informed that the chief was about to arrive, and that he was much put out (or "that his heart was sore") at the white man having come into his country without sending first to let him know. He paid my camp a short visit, but would not come near me or look at me. He was a young man, with a bad countenance, with small tattoos all over his body. The only remark he addressed to me was "You are a Portuguese," which I denied. His every action depicted the excessive uneasiness of his mind at my having appeared in his country. I cannot go into the eventful story, as it would be too long. Suffice it to say the women and children, some of whom had approached, were sent home, the chief left, but the warriors remained seated in groups all round our small scarem (camp inclosure). Everything was ominous of approaching troubles, and one of my boys who had stuck to me faithfully from the start was invaluable at this time in telling me what was going on. Fear had evidently entered the ranks of my small party, and for the next thirty hours I experienced great anxiety in trying to prevent a stampede which at times seemed inevitable. The sun set and rose again, but we had not moved. It would have been

impossible. But through the medium of an old woman who lived with the king I heard that that night we would all be massacred.

Soon after the sun had set and all was hushed in night, the word was given, the men shouldered their loads, and we abandoned our dangerous camping ground, retracing our steps under the sombre shade of the great granite mountain which reared its lofty head many hundred feet above its base on which Chuzu's chief town stood. By sunrise we were again on the Umvukwe summit. Here I may remark that the chief features of these mountains is their bald and cone-shaped tops. Standing on the summit and facing towards the east the picture was indeed a wild one. Great granite hills composed of boulders in every conceivable and grotesque shape lay piled the one above the other. One of these gigantic masses of crystalline rock stood up high above all the rest, the crowning effort of nature's convulsion. The natives call it Barré mountain. But I must hurry on. The next day we were again camped on the Etsatse river, having retraced our steps about 50 miles. Here a desertion took place, and I was compelled to leave, and with four followers only, wandered to the eastward, passing through a country rich in iron and copper ore. The natives here make beads of iron and copper. The Rusaka or Uakania mountains lay to the south-east and overlook the Grumapudzi river, a tributary of the Amazoe, where the natives wash the alluvial deposits in the river in small wooden hollow trays and extract the gold, which they put in large quills and will carry great distances to exchange for an ornament or a piece of cloth. This district is called Wata and extends to the Amazoe river. Lemon and citron and the sweet potato are grown here. On reaching the outskirts of the town called Inyota, and having benefited by former experience, we sent some pretty cloth to the chief, Chibabura by name, and were well received, getting an entirely fresh party of Makorikori who went back and brought the valuables from our last camp.

These people live in a very primitive way and much resemble the Mashona in almost every particular. Their tribal mark is their mode of tattooing the face. They make small horizontal cicatrices across the forehead, in a line down the bridge of the nose, around the temples, and in different patterns all over the body. They manufacture pottery of a very common kind, and carve troughs and dishes out of wood. They make nets for catching game, and blankets from the inner bark of the machabele or mimosa. The women, some of whom when young are pretty, pierce the upper lip, and in it wear a thin wire ring, sometimes ornamented with a few beads; while round their necks hang pendant-like numbers of charms of ivory, wood, and the claws of wild animals. Many of the men had flintlock rifles decorated in a wonderfully ornamental manner by means of brass-headed tacks and brass wire.

These people wear brass wire bracelets, the plaiting of them showing ingenuity; anklets and necklaces with a small knife or snuff-box stuck

in them, and also adorned with white fossil stones from the bed of the Zambesi river.

The warriors danced and performed various manœuvres with their guns, jumping in the air, firing and turning round and round, gracefully and with great rapidity, pointing with their guns to the four quarters of the globe. Their method of salute to a stranger in lieu of shaking hands, which is not known amongst them, is by clapping hands, which they also do as a signs of thanks. They make drums from the hollow trunks of trees, with hide stretched over one end, and play on them with hands and sticks. They form their iron implements on nature's crude anvil, their hoes being much valued by tribes in the Zambesi valley. They pass through life in a happy but thoughtless way. Their time is spent in supplying their daily wants and in herding their cattle. I have not seen horses or donkeys in these parts. Their hopes and fears are concentrated on the crops and the possibility of attack. They have no ideal God, and have no thought of any existence after death. There is music in their strange and weird songs, which they never seem tired of singing to the accompaniment of the sound of a thin wooden block tuned with iron sliding keys, whilst there is a rhythm in their long-worded speeches.

On the 18th morning of July we again struck towards the north through a marshy country of deep black soil traversed by small streams, and across the Ruia and Rumabiri and Monero rivers with their forest-clad banks, past the town of Zingabila with its great basaltic cliffs rising perpendicularly for hundreds of feet above the town. The inhabitants, who pushed and crowded to see me, said that they had never seen a white man before. Thence we advanced through a country of low but thick forest drained by two large rivers, the Mutua and Ruiana, tributaries of the Amazoe, inhabited by lions, who roared round our small camp at nights. Crossing to the further side of the Makomwe Mountains, where quartz reefs again crop up here and there, intruding through the country rocks, we saw, stretched away in the far distance, 1000 feet beneath us, the great basin of the Zambesi.

Leaving the country of the Makorikori, we descend rapidly, and arrived at the town of Chibinga, on the banks of the Msingua river. Two human skulls adorned either post of the entrance gate. Our reception was cold. Necessity compelled a prolonged stay at this town, during which time I wandered for many miles round, finding alluvial gold in the sandy river beds of the M'Singua and other tributaries of the Umkumbura river, which runs an average course of north-west to the Umzengezi. There are also other smaller affluents of the Umzengezi, such as the Benia and the Mkoma, on the banks of which I found salt efflorescence in abundance. Traces of gold may also be found in their beds.

Doubtless many auriferous quartz veins are exposed in the mountains

we had just left. Numberless rivulets spring from these mountain slopes, which during the rainy seasons swell and rush forward on their downward journey, carrying with them the gold-charged silt from the waterworn rocks to the great sandy river beds in the wide forest-covered valley beneath. These almost level channels act as settlers, and extract all the treasure from the waters long ere they reach the Zambesi. The gold, of which I have many specimens, is in general free of base metals, although I have observed in some instances iron rust on the flakes of the precious metal.

My party, composed of the Korana, Mashona, and Makololo, the three who had remained faithful up to this time, and the thirteen men from Inyota, informed me they had now wandered far from their homes. They were tired, and must get back to their wives, as the rains would be here before very long, and they wished to retrace their steps.

The natives of this town were of the Mtande tribe. They seem to have large numbers of slaves, purchased from Senga, a town on the northern banks of the Zambesi. The Senga women are easily distinguished from the others by the excessively protruding upper lip in which they wear a ring of ivory or wood, calling it *jaja*. By paying particular attention to her toilet and enlarging the ring year by year it is possible for a woman to develop the upper lip so as to protrude 2½ inches at least. They cultivate with the hoe small fields, cleared in the heart of the forest, of millet, maize, sweet potatoes, and tomatoes. Rice is very scarce. Cotton, which is indigenous, was grown in small quantities and spun by hand, and in a most primitive manner woven into coarse but very strong blankets. The women, as in other parts of Africa, prepare the food, and the men build the huts and hunt game.

The husk of the millet and rice is cleaned in mortars hollowed out of the trunks of trees and ground into meal on a block of granite.

This country, 1300 feet above the sea, may be described as one vast forest extending northward from the foot hills of the Makomwe mountains to the Zambesi. The vegetation is abundant and luxuriant; comprising great jungles of acacias, aloes, and thorned creepers and prickles of every description. The gigantic Adansonia or baobab is exceedingly common throughout the basin of the Zambesi. Great coarse reeds with needle-pointed leaves line the banks of the wide sandy rivers, where here and there you find holes dug out by the rhinoceros, lion, and other wild animals as they search for water in these thirsty beds. I saw the spoor of elephants here, but they are very scarce.

The tsetse fly abounds in these parts, consequently cattle and horses are unknown. Poultry of small size seem to do well. The native women dry quantities of the tsetse fly and pulverise it with the bark of a root, and mixing it with water give it to the young animals, such as dogs and goats or sheep, of which they have very few, seemingly only kept as pets.

A great feast was going on at the town. My men all seemed beside themselves with joy at the thoughts of returning home. Native beer made from millet flowed like water. Kudu meat was in abundance, for the Korana and I had been shooting every day to keep peace amongst the men. The open centre of the town swarmed with human beings as black as ebony. A turmoil of voices rent the air; the dusky maidens danced and sang, keeping time as they stamped the ground with either foot, and following each other in long waving lines in their snake-like dance. The drums never ceased to beat for three days and three nights. In the day the feast continued, when the sun was at its greatest height throwing down rays of fire on the festive crowd, the fat melting in the glistening locks of their woolly heads and running all over their bodies, seeming to give zest to their movements; for the men would vie with one another in their wild contortions. The men of the mountains who had come with me were by far the best dancers. There was no peace for me in the daytime, hunting for meat which had to be stowed in the small hut set apart as my dwelling, giving off a horrid effluvium; the rats, too, held high carnival and made the night hideous as they ran with their cold feet over my face.

The feast over, I bade adieu to my old followers, all of whom left me here. Striking out in an easterly direction with an entirely fresh crew, we crossed many dry sandy river beds on which might be seen the tracks of almost every description of wild animal. Large herds of baboons might be seen playing and climbing the great forest trees. We passed the Kafua mountain on the left. The Dake river, which we crossed, has its source in the Vunga mountains and runs—through a deep alluvial soil overlying stratified rocks which jut out here and there in the river bed, covered with thorns and low forest—to the Zambesi. Again we crossed a divide and found all the rivers running to the south-east into the Amazoe. The Kangudzi, the principal affluent, has no water except in the rains. Next we passed numbers of villages occupied by different Zambesi tribes. These are constantly changing their towns, migrating from place to place in search of richer land, as the soil is poor and soon becomes exhausted. The villages have therefore an exceedingly temporary appearance, and the people seemed more indolent than any we had hitherto passed. I observed numbers suffering from dreadful skin diseases. The country is subject to great droughts. Trees with stony apple-like fruit may be seen here and there. A small bush fence encircles the coveted tree which shows that some one claims the fruit, thus suggesting the idea that pre-emption law exists amongst these sons of the forest.

It was now eight months since I left the Cape of Good Hope on my journey to the north. My condition was a bad one. My stock of trading articles was exhausted. I sold my empty cartridge-cases in exchange for meal, as game was scarce. I had no shoes but those of my

own manufacture, made of zebra skin. My feet were shockingly blistered. I hobbled along encouraged by the thought of being able to get a new fit-out at the town of Tete, or Nyungwe, or Kunyungwe, as the natives call it. The blue outline of the distant hills (Fema mountains), which lay just to the west of the town, became clearer and clearer, till on the morning of the 28th of August we stood on the summit of this low range and viewed with happy hearts the Zambesi river. Before the sun set we were comfortably housed at the Portuguese governor's house.

Senor Luis Joaquin Vieira Braga, the governor, treated me with great kindness and courtesy, giving all the information possible in reference to the contiguous tribes, the country, its prospects, and past history—particulars which are altogether too voluminous for this paper. The Portuguese possessions of East Africa are divided into districts ruled by governors, with a governor-general at Mozambique, the headquarters of Portuguese authority. The district of Tete extends from a short distance west of Senna to eight days' journey to the west of Zumbo, the furthest Portuguese station on the Zambesi, and about 450 miles from the sea. Its foundation dates from 1740, and the tribe which inhabits that belt of country are called by the Portuguese Wazezuros. The town of Tete is situated on the southern banks of the river on a series of sandstone spurs running in ridges, and gradually sloping towards the water, almost parallel to the stream. On the rocky mounds the houses are built. The fort on a hill-top and the Caroeira Mountain further to the west complete the background to the picturesque scene.

In the days when Livingstone passed here on his westward journey of exploration this was a lively city. Many Europeans, mostly Portuguese, helped to swell the commercial population, which lined the streets and bartered with the black man for his treasures of ivory, gold, and human flesh.

To me it was sad to walk in the streets of this town. Solitude reigned supreme. On every side could be seen the work of time's relentless hand in the crumbling ruins of houses once inhabited by prosperous merchants. Indigo and other weeds clothe the bare spots where houses stood.

The governor's house stands close to the banks of the river: its glistening whitewashed walls and red-tiled roof and pillared entrance forming a picturesque and imposing feature to the town. The hospital and the houses of a few merchants form the chief buildings. There are about thirty Europeans still living in the city, who complain that the period of prosperity has passed. The elephant has trekked to the far interior, and of course carried with him the precious ivory which has formed since the conquest by the Portuguese the chief feature of commerce and trade in these parts. Thousands of hunters still leave Tete every year with their flintlocks and spears in search of the much-

coveted animal, but the results are comparatively small, and year by year are diminishing.

The church has crumbled to the earth, and now the bells toll from a diminutive structure where the Jesuit Fathers, with their small flock, perform the holy rites of their creed in but a sorry substitute for a church. They must indeed view with sadness the results of their predecessors' work, who centuries past (for the Jesuits were evidently among the first to set foot in these wilds) wandered amongst these savage people and courted martyrdom.

I heard that last year two white men had come here with a view to prospect the gold resources of the Amazoe river, the numerous affluents of which we had crossed on our journey here, which river flows into the Zambesi about 20 miles below Tete. Unhappily, however, they met with difficulties, and one dying of fever, the other did not prosecute the undertaking further.

This region is intensely hot, and especially oppressive during the rainy season. The thermometer registered in the shade, that is to say in my chronometer-box, 89° to 90°, but in the sun the heat was almost unbearable. The fever is worst at about the change of the seasons. Many men were in the hospital in Tete.

My stay of eight days over, I was in thorough repair. But barriers to my progress seemed to spring up on every side. There was war on the Lower Zambesi, a Portuguese and Mazingire war on the Shiré river, and the tribe of Makanga people on the north, whose actions could not be trusted. However, I had recruited an entirely fresh party. It included an old slave as interpreter and some Landeens of Zulu origin, who had brought ivory to Tete, and were on their way home, and who said they would guide me and carry light loads. We crossed the Zambesi, passing the little picturesque island, which faces the town, with its numerous green shrubs and silvery sand, and landing on the further shore.

Here the Landeens joyfully divested themselves of the small skin sporans that covered their nakedness. We wended our way northwards, crossing the Revuque river, one of the largest tributaries of the Zambesi, which, breaking its banks during freshets, has formed islands and various channels near its mouth. We passed on through a region of forest of varying density, thorny jungle of mopani and long coarse grasses with clusters of bamboo cut by dry sandy river-beds in some of which a small stream runs, all draining towards the Revuque river. Large herds of zebra crossed our path, and brought meat in abundance to my followers. Crossing the Mjobva river and the Shikambe, both giving their waters to the Zambesi above Lupata Gorge, we camped by what I have christened the Palm Wells, 800 feet above the sea. These high, lovely trees surrounded our camp, while the lofty and broken outline of the Salumbidwa mountain loomed up in the eastern sky. The men kindled fire with two sticks, rubbed together, as do the Bushmen of South Africa,

and our food was cooked in the rudest earthenware pots. Then they by turns gorged and slept, snuffed and sneezed, and smoked dried hemp, coughing in the most violent manner. Tsetse fly light on our thinly clad bodies, and make us jump again. Coal exists in this region; some pieces the natives brought to the governor of Tete looked to me to be of fairly good quality.

On our left are the Mwendapezi people, who call their country Chuwe. Still further to the west and on the banks of the Revuque river live the Makanga tribe under a defiant and despotic king, whom, when a boy, and in view of his advent to power, the Portuguese captured. He received some tuition, and on his brow was sprinkled the holy waters of the Christian font, naming him Cipriano Gaetano Pereira. But savage instincts were strongly rooted in his breast. Returning to his country he came to the throne in 1876, and among his tribe he is known as Kankuné or Sakakaka. He gratifies the grossest appetites of his inhuman disposition by the sacrifice of human beings and the shedding of blood. Brandy is his master and cruelty his ruling passion. He kills numbers of his people every year. On an occasion in which an eye-witness, with whom I afterwards became acquainted, was present, the king, in a fit of rage, offered up his favourite wife as food for the crocodile. He carries on wars of rapine and murder, having beneath his power many thousand warriors armed with flintlocks, assegais, battle-axes, bows and arrows, and shields. The firearms have been introduced principally by Arab caravans from the East Coast. Traders have been robbed, and these people ignore the Portuguese powers of Tete.

We left our camp and turning N.N.E., went through a sun-parched forest where the prairie fire had swept away with its vivid flames the thick undergrowth of rank grass. Noxious vapours rose from the heated soil, having a sickening effect as they were inhaled. We climbed the hills which bound the basin of the Zambesi on the north, viewing black basaltic mountains with cone-shaped tops to our left. One of these, of pyramid form, is called Bonamarungo Mountain. Crossing the backbone of a rocky spur, we descended to the Mvudzi river, a large stream of the clearest water, enclosed between two mountain ridges 100 feet in width, which leaps over precipitous falls and flows westward to the Revuque river.

Palms and a large variety of great forest trees adorn the steep slopes which bound the river banks. The rocks in this region may be classified as hornblende schist, with traces of copper pyrites and green carbonate of copper seamed with veins of quartz. Kingfishers, divers, and other water birds swoop from the boughs that overhang the waters, but they give forth no song. Fish may be seen in every pool. Our onward journey towards the north carried us through endless difficulties, desertions, and other incidents. The mountains rise up on

either side; on our left the Kapirizange chain, while on our right was the Manganja range forming a continuous rocky border northward to Lake Nyassa, hemming in the high tableland of Eastern Equatorial Africa. The Landeens call these mountains Makurungwe or Makungua.

As we passed on, the features of the country changed but little, and still ascending we traversed belts of great coarse reed-like grass waving far above our heads, in which walking was very laborious. A great fire surrounded us. The country was enveloped in smoke. The charred straws fell like winter's withered leaves. With the greatest difficulty we avoided the fierce flames which crackling and coiling round the stems of the trees leapt upwards to the skies. Then we came to the well-watered rivers, Mkondozi and Mauni; the former, with steep alluvial banks, is clothed with mopani and tropical shrubs. We traversed the tortuous path that leads up the eastern slopes of the Jandani mountain, and standing 5000 feet above the level of the sea, the highest point reached in all my journey, we viewed towards the south and east the tops of a thousand hills. This country is abundantly watered; its mountain regions catching the rain-charged clouds wafted from the Indian Ocean by the prevailing winds. We still pressed on towards the north. Nothing relieves the monotony of the dumb surroundings. Game is scarce and the winged songster is unknown. No habitation meets the eye. Crossing the Rumbuni river, with its large volume of water, and the Vilange, we arrived in an Angoni town under the shade of the Gutarre Mountains on the west. Moments of anxiety and awkward dilemmas surrounded me. The Landeens had deserted before reaching here, and now the Maraves or Tete men left me. I was alone! Days passed by, and with signs, beads, and cloth, I recruit six men (Angoni from this village) to whom I could not speak. We wended our way to the north, and after a walk of 15 miles, crossed near to the head-waters of the Revuque river, at an elevation of about 4000 feet above the sea. Here in the deep silent pools may be seen hippopotamus, while crocodiles bask on the sandy banks. At length we reached the suburbs of the town of the Angoni despot. Under most disadvantageous circumstances am I brought before him (Tchikuse), who with numerous followers came down to the centre of the town, where I was seated on a rock, to examine me. No words were exchanged. He laughed and seemed rather to scoff at my dejected appearance. When he laughed all his courtiers chimed in. I was convinced I had given them a great surprise, if nothing worse. Tchikuse is a young man of enormous dimensions, with a light reddish brown complexion and rather a vacant countenance; but he is of a very observant nature and easily impressed by trifles. I may also add that he is quite wrapped up in his own importance. Vanity beams out from every line of his fat and sensual countenance. This is one of the chief characteristics of these African potentates.

I was led to a very small hut, and during the next few days a chapter of incidents occurred. It would be hard to describe the utter loneliness of my position. I passed disturbed nights, not knowing what the morning would bring forth. A dusky daughter of Africa, whom I afterwards discovered to be the king's sister, used to come in the night and sit beside me, and in whispering tones would talk by the hour, constantly repeating her brother's name, Tchikuse, with awe; and shaking her head and drawing deep sighs. Not a single word of her talk could I understand. She never forgot to bring some beer (pombe) with her, the bulk of which she imbibed herself. I studied the small chart under the light of the smouldering embers of a small root fire in order to fix my position, a thing I did not wish to do in the daytime, being particularly careful not to show my sextant, watch, or papers, so as to excite the suspicions of these fetish-worshippers; who, I may add, have their witch doctors, rain-makers, and dice-throwers. There suddenly appeared, as though dropped from the clouds, a Portuguese elephant-hunter, who having just returned from a hunt and hearing of my arrival immediately came to find me. Time will not allow of my going into details. He was very much surprised at finding me without any followers, as he never travels without a strongly armed escort. My gratitude to him for kindnesses compel me to say that a more noble, generous, kind-hearted man I have never met. He did everything that lay in his power to help me and explain away the numerous speculations which filled the king's mind in regard to me.

I was accused of being a spy and my presence was considered as ominous of evil. They insisted that I was not a man; that the race from whom I sprung had no home and no country, but were wanderers roaming on the face of the earth. Senor Da Costa, the hunter, was my interpreter on all these occasions.

After some days the king sent for me, saying, "I want to see him speak, I do not believe he is your brother." I went and found the king surrounded by courtiers and slaves in a circular hut, the walls and roof formed of bamboo thatched with long coarse grass while the black polished floor was of plastered mud. The despot, in whose hands lay the destinies of a thousand souls, sat on a cane plaited mat, robed in a blue calico sheet, the gift of my friend. In his right hand he held a small gourd of native beer which was replenished by the slave girls as soon as he had emptied it. His old and fat mother sat in front of him, with whom he had indeed a heavy score of debts, having killed six of her lovers, and the seventh, a young and rather good-featured man, on whom she lavishes cloth and beads, is in daily danger of having his earthly career cut short.

I was unable to get an answer as to when I could get men to take me to the Lake.

The king's power is absolute. The headmen who rule the outlying

villages dress their hair in the form of a skull-cap, trimmed neatly round and coped with a ring composed of the wax deposited on the bark of trees by a small insect. The ring is a gift of the king to the chiefs, which is a sign of distinction and raises them socially in the eyes of the people. The king does not wear the ring. He anoints his head with nut-oil and wears a very neat small bladder on the top of his head.

The soil is poor, but abundant moisture insures good crops. Tobacco of a fairly good quality is grown, and the people are inveterate snuffers. Small hump-cattle and goats graze on the green grassy banks of the little rivers. These people are known as Angoni and are said to be of Zulu origin, although in reality they are a very mixed people, for when the Landeens or Zulus from the south conquered this country, the race that then occupied it were Chopetta, who of course became the slaves of the triumphant and victorious army. But through intermarriage the language of the Landeens has become corrupted. The Landeens when entering or leaving a hut or your presence salute you with the words "Sikomo Bambo." I noticed they used it on all occasions, and in thanking for a present, &c. The Chopetta people used the word "Eko" for the above. "Tekuone" is also a word used by them in saluting, meaning "I see you," and answers to the "Sagu bona" of the Zulus. If you come from a distance and are acquainted with them they clap the hands.

The Makanga tribe, of whom I spoke, are great enemies of this tribe and the name must never be spoken out of a whisper. The Angoni do not disfigure their faces as do the tribes farther to the south. Their principal diet is maize meal, but when beer is plentiful they will live for days on it without touching solid food. It is a very palatable drink when strained, slightly acid, and great quantities may be drunk without intoxicating. A small species of rat is common among the loose rocks on the hill-side; and little boys may be seen at all times hunting them with sticks, for they are much valued as a delicate dish.

The Angoni are essentially a tribe of slave kidnappers; they sweep down like a whirlwind on the neighbouring tribes of Ajawa and Manganja, &c., in the Shiré valley. They lay waste the villages, pillage the gardens, and triumphantly bear away the human spoils, young men, women and children, to offer for sale at slave markets in their highland home. This is one of the greatest slave-trading centres of Africa.

On the march I have seen these young warriors playing to show their agility. Running, they jump forward and go through their numerous evolutions and warlike contortions, leaping in the air, kicking their shields while both feet are off the ground. When they would again alight they would entirely disappear in the long waving grass. The women shave their heads, but in time of sorrow and trouble the hair is allowed to grow. In men and women the dirtier they are the more complete is the mourning.

The wives of a dead chief become the property of his successor who

keeps those he fancies and gives the rest to his friends. The women and men adorn themselves with bracelets and anklets of hide, ornamented with brass, showing to advantage against the dark skin. Very small aprons of leather, feathers, or even a piece of rag cover the nakedness of the men, while the women use cloths of bark; but all the king's wives had calico round their loins, for he is paid well for slaves and by ivory hunters. Many young girls were seen going about entirely naked, others with small fringes of beads. They were much delighted on being presented with the smallest piece of cloth or a thimbleful of beads. Cruelties by the king are common; one of my followers having had his ear cut off and one of his eyes put out. Other indescribable horrors are perpetrated on men and women at the pleasure of his majesty. I remarked that many of the men carried the small carved wooden pillow similar to those used by tribes south of the Zambesi.

At last, through the strenuous efforts of my friend, arrangements were made for a start, although grave apprehensions filled my mind at the thoughts of travelling with these Angoni. We saunter through the town; the sun has just risen and smiles upon the earth. We see the preliminaries of an execution; a crowd is coming, knobkerries and other weapons fill the air; the motley crowd rush onwards, pushing their victim roughly on either side, until they gain a little distance from the town; we follow and see the assegai plunged into the side of the writhing figure, the excited crowd rush on, boys of all sizes and ages, their clubs swinging like the arms of a windmill in a gale. One after another would go up and have a smash at the lifeless corpse which is there left as prey to the hyena.

The day dawns, and with gladness and a heart full of gratitude to my kind friend Acosta, I bade farewell to the town of Tchikuse. Taking a N.N.E. direction we struck out into the great, wide, and treeless plain, with its barren peaks of igneous rock adorning the disconnected mountain tops which rise at intervals from the vast tableland stretching far away to the horizon, and forming one of the principal geological features of Equatorial Africa.

Large troops of cranes beautify the river banks. In every village may be seen the slave in the yoke, who after purchase is taken to the headquarters of the East Coast trader—"Nazaras," as the people call the Zanzibar agents, some of whom are constantly in this district. There he sits and waits and sees the sun rise and set for months, but the yoke is still round his neck. When the caravan is ready to start he is attached to another man, and with loads on their heads turn their faces to the east and leave their homes for ever. They are well looked after with a view, if hurt, of their probable depreciation in value. The numbers in a caravan vary. One that started during my stay had 350 all told. I will not endeavour to paint the horrid picture of this atrocious traffic, for it has been so frequently described.

We passed numbers of villages thickly inhabited by the Angone tribe, all under Tchikuse, and crossed the Revubwe or Revuque river for the third and last time; here it is a small rippling stream. Still farther to the north, rising gradually, for now we are 4500 feet above the sea, I saw some native iron-smelting furnaces; the slag that lay in small heaps I found was very vesicular, the metallic iron was in irregular buttons, evidently reduced from brown hæmatite or hydrated peroxide of iron. The climate of the plateau is bracing and healthy.

On the morning of the 25th of September the course was changed, and with joy I turned my face towards the rising sun. The mists of early dawn still hung over the gigantic mountains of the Kirk Range, which towered up on every side with their rugged peaks of torn and tilted granite. We descended into the valley of Lake Nyassa. Here many little streams leap down the mountain sides, and their glancing rippling waters run singing to the great lake. We camped in a village beneath the shade of great sycamore trees.

I was endeavouring to get to a village on the shores of the lake called Mpemba, in the hope of canoeing across the lake, but reports of the chief's attitude being very antagonistic to white people, while the natives of the village where we stayed said it would not be safe. Compelled to alter the course, we skirted round the southern shores of the lake through intense heat and arrived, after encountering a host of difficulties, at the deserted mission station of Livingstonia.

Here I was destined to see another phase of vicissitude, but this time it was quite the opposite of my last exciting experience. All the hopes of being welcomed by white faces were dashed to the ground. I walked along the lonely and deserted street and looked in vain for the white man. Empty and deserted houses appeared on every hand, with a few sepulchres to add to the melancholy scene.

My Angoni men showed great uneasiness at the surroundings, and seemed inclined to fly and desert me. But I was determined to keep the Marave men Acosta had given me, so as night drew near I shut them in with myself in the deserted dwelling of a missionary.

The following morning as I walked out the sun had risen in all its splendour on the lake; I looked around, and discovered that my anticipations were well founded. The Angoni had fled. My position was a deplorable one. My stock of trading articles was exhausted with the exception of a few yellow and blue beads, and the former the Ajawas would not take. They had evidently gone out of fashion. The question arose in my mind as to how I should get away. The Ajawas would not risk their canoes on the Shiré river for fear of the hippopotamus. Day followed day, but no change in the melancholy surroundings. I would wander on the shore and watch the silvery waters of the lake as they played on the sandy beach. I would climb the highest point of the rocky hills at the back of the village and with telescope scan the far horizon.

On these occasions my only company were numerous monkeys, and now and then great fish eagles with their strange and weird notes would swoop down close to me on their way to the lake. Then I would return again at night and watch the sun set, the loveliness of which would carry my thoughts far away from the loneliness of my position. Game was scarce, and in view of a long stay I economised my small supply of beads and lived on fish eagle and doves and occasionally a fowl. Sixteen days and nights thus passed away. On the 11th of October, ever to be remembered by me, I was awoke at night by the natives excitedly calling out "A white man!" I sprang from my blanket, and running along the beach I could see a faint light on the lake, but the night was very dark. I soon set fire to the dry grass which lined the beach, and in a moment there was an immense blaze throwing rays of light far into the lake. It would be impossible to express my feelings in words. I could discern the bows of a small steamer peering through the darkness. Two men put off in a small boat. They were perfectly thunderstruck at finding me, and many were the questions which they put as to where I had come from. The men turned out to be Lieutenant Giraud, who had been in command of an expedition sent by the French Government to explore Lake Bangweolo, a gentleman with whom I formed the strongest friendship, and whom I found to be a most intelligent companion, besides being a good sportsman and kind friend; the other, a Mr. Harkiss, who was in charge of the small steamer, which is kept in connection with the missionaries on the lake. M. Giraud had been deserted on Lake Tanganyika by his men, and was on his way to the coast. So we travelled together down the Shiré river, the banks of which teem with game of all descriptions, including abundance of water-fowl.

Touching at the mission station of Blantyre, we then canoed down the lower Shiré. The banks were lined with the Mazinjire tribe taking refuge from the Portuguese, with whom they were at war. This latter part of the journey was full of incident. We arrived in Quillimane in November.

It was particularly noticeable that in Northern Bechuanaland, also on Lake Nyassa, and on the Shiré river, that these regions are yearly becoming desiccated. Hunters who have camped by the rivers I speak of, at intervals extending over many years, can remember running water in the beds of numerous tributary streams even in the dry season, but now they have to dig wells in the arid sands. With regard to Lake Nyassa, the level of the water is several feet lower than it was when Livingstone discovered it in 1859. The Shiré river and Lake Pamalombe, through which the Shiré runs, have less water to a marked degree every year; a fact that has been observed by those who have constantly been going to and fro in the little steamer which supplies the missionaries on the lake. My friend M. Giraud, I may also state, found the waters of Lake Tanganyika receding.

From what I have said it will be seen with what difficulties a single European without reliable followers has to contend in traversing the unknown central regions of Africa. But does it not say much for the negro that such was possible, for of him I have heard many hard things said. But he has many good points. True, he deserted me many times, and left me in unhappy dilemmas, but then again he has treated me kindly too. I lived for the most part like the Kaffirs, and never tasted alcohol during my whole journey; tea proved by far the most refreshing drink when I could get it.

It has not been my fortune to fall upon any extraordinarily fertile spots or any such countries as some of our most eminent travellers have described as offering inducements to the inhabitants of overcrowded Europe. In every instance the discouragements have been greater than the inducements to foster the colonisation of Africa by European subjects. The primitiveness of the modes of transportation forms a great barrier to progress.

The accompanying maps have been carefully compiled from observations made from day to day, principally by compass bearings, time, and meridian altitudes of stars for latitude. The heights marked on the sectional elevation were for the most part taken by aneroid barometer corrected at Kew Observatory, and checked at various points on my route with reference to heights arrived at by boiling-point thermometer.

From the time I left the Cape of Good Hope till I arrived on the shores of Lake Nyassa I was never robbed of a single bead or a yard of cloth, although for months the goods were completely at the mercy of the natives. As far as my own dealings with them were concerned, I found kindness, firmness, and justice, combined with truthfulness, have been the best guide to success.

After the paper,

Rev. Horace Waller said Mr. Kerr had mentioned that amongst the Makorikori he found a great number of women, evidently strangers to the country, all wearing large lip rings. This substantiated a very melancholy fact, that not only was the slave trade very active towards the seaboard, but it was also carried on in the interior to such an extent that when he was there the Shiré highlands were almost depopulated. It was the custom of the Portuguese merchants to send filibustering expeditions into the hill country to bring away vast numbers of slaves to Tete, the greater part being women who used the lip-ring in question. Then instead of being forwarded to the sea, down the river, they were sent inland and dispersed among the tribes whom Mr. Kerr had visited. That branch of the slave trade would never have been discovered unless Livingstone had brought it to light; but it still went on unhindered. He rejoiced to hear that the downfall of Tete had nearly come about, because it had always been the very eye of the slave trade. He regarded its ruins with delight, and he hoped there would never be another Portuguese slave-trader there. With regard to the desiccation of the country, far away to the south and west of the Limpopo river, Livingstone found watercourses strewn with shells which must have had fish in them within comparatively recent times, but now there was no chance of water getting into those courses again. Travellers to the

lake country were seriously embarrassed by the lowering of the level of the Shiré. It was the most serious question which confronted those who were engaged in the vast Scotch enterprises among the Angoni, for instance, on the west of the lake. If the level of the water fell a little more, the sill at the south end of the lake would become impassable. Mr. Kerr was evidently one who kept his ears and eyes open and took intelligent notice of capabilities and natural features: would he so far permit himself to be drawn out in detail as to reply to a question concerning North Bechuanaland which came under this heading? Anything respecting the water supply, present and future, must be of great value to numerous persons inquiring about the capabilities of the land. The great excitement about colonising Africa had rather abated, but it was still to be hoped that somewhere in Central Africa there was a district which might be colonised. Might not a system of irrigation be carried out in North Bechuanaland so as to make it available for hardy and enterprising colonists? He did not like to sit down without pointing to a fact which the modesty of the explorer had kept well concealed, viz. that his journey from the Zambesi to the lake was an entirely new addition to our knowledge of that part of Africa. Mr. Moir was, however, present, and anything respecting the surroundings of the lake would come much more freshly from one who had spent years there, and who had only returned to England within the last week. He (Mr. Waller) well remembered the Kirk range of mountains, and he had often longed to know what was on the west side of them.

Mr. Kerr replied as follows:—The success of irrigation wholly depends upon the physical features of the land. Before any intelligible estimate could be arrived at as to whether Bechuanaland or any considerable portion of that country could be irrigated so as to prove a tangible and remunerative success, it would be imperative that a rough survey be made by some expert in that particular line. But judging from what I observed while passing through Bechuanaland, I was not favourably impressed with the country as being a field either for immigration or irrigation. As there are no rivers carrying a good volume of water all the year round, a natural supply from that source cannot be looked for. Therefore the most expensive system of water supply apart from pumping would have to be resorted to, namely, the construction of large storage reservoirs situated in extensive catchment basins. The question arises, Are these natural basins to be found in Bechuanaland? Admitting that they are, there is but one form of dam that would be practicable, and that is the earthen dam with puddle centre, allowing that the soil is suitable for the construction of such dams. But high earthen dams or high stone dams for the purpose of storing water to feed large irrigating distributing canals would be far too expensive a system to prove remunerative. It is my opinion that the main irrigating canals would inevitably have to traverse belts of country where the soil, from what I have seen, is of such a nature that percolation would defeat every effort. In order to provide against droughts, the storage reservoirs would have to be of such gigantic dimensions, or so numerous, there being no small feeders in such times to compensate for evaporation, waste, and absorption, that the plan of high earthen dams or high stone dams as a system of water supply would be quite out of the question. So far as my knowledge extends, I am not aware of any artesian wells that give a large volume. Near the head springs of the Notuani river irrigation might be effected on a small scale, and a little might be done in other localities. What individual effort might accomplish in the way of well-boring, windmills for garden irrigation-works, and cattle-troughs, also the storage of small quantities of water for small areas, I cannot determine. What I have referred to in these few remarks is irrigation on a scale commensurate with the plan of making the great and, I must say, arid wastes of Bechuanaland habitable and desirable as a home for civilised man.

Mr. MOIR said that Livingstonia, more properly called the Cape Maclear station of the Livingstonia Mission, had been temporarily abandoned, because of its unhealthiness. All day long in the hot season the sun beat on the rocks, and all night long the heat radiated from them, so that it was impossible to sleep till the night was nearly past. The residents thus became weakened and unable to stand the fever, from which several had died. The Mission's headquarters had therefore been moved to Bandawe, a place about midway up the lake on the west side, but he believed it was intended again to place men at Cape Maclear during the cool season, when the danger to life would be much less. With regard to the desiccation of the region, a steamer had been running to the north end of Nyassa for ten years, which had been regularly laid up and painted during the dry season. The water has slightly diminished, but there are not yet sufficient data to prove that progressive desiccation is going on. Shortly before Mr. Kerr visited Tchikuse, that chief had sent down to the Blantyre region almost his whole strength, a force estimated at about 2000 men, and they carried off numbers of slaves. The people were warned, and escaped in large numbers to the hills, while others crowded into our own stockade. Wherever a few men gathered about the hill-tops and fired shots they were left alone, but the invaders made one decided stand around Mount Malabvi till the people had to come down and submit. The slaves were taken back to Tchikuse's headquarters, where Arabs were waiting the arrival of their "black ivory." They were then sold, and probably conveyed to the coast. The missionaries at Blantyre were able to induce the Angoni to leave much sooner than they otherwise would have done. One trustworthy native whom he sent down saw a man and a woman who had been killed because they had not hurried along so fast as their captors desired. Colonisation on a large scale was not a question for the present, but in Blantyre and Mandala there was many an acre of good coffee; while oranges, citrons, and other fruit-trees succeeded well. Although he could not entirely agree with some travellers in their glowing descriptions of Central Africa, he believed that in time the great capabilities she doubtless possessed would be more fully utilised.

The PRESIDENT said Mr. Kerr had asked him to mention that he had received a telegram from Lieut. Giraud, who said, in answer to an invitation to be present that evening, that he was extremely sorry he could not come to London and attend the meeting, as he had wished to add his applause to that of the Society in reference to Mr. Montagu Kerr's journeys. Mr. Kerr had certainly given an account of a very remarkable journey of 3000 miles, part of which had never before been accomplished by a white man. Some gentlemen who had lately been to Bechuanaland had returned with favourable opinions with regard to the country. That showed how careful it was advisable to be in all matters of emigration, and always to have an organisation ready to receive the emigrants and locate them on the land. That view held good more completely in Africa than in any other country. The obstacles towards settling in the country seemed to arise less from the disposition of the negroes, than from the great want of water. It seemed rather puzzling how the enormous slave caravans could leave the lake regions and then disappear, while, after all, a comparatively small number were exported from the coast. He had been told by Mr. Kerr that the possibility of continuing the slave trade depended on the ivory trade, and that must rapidly diminish owing to the diminution in the number of elephants. Mr. Montagu Kerr appeared to have been very much at home among the natives, and they recognised in him a gentleman worthy of all kindly reception. He was sure the meeting would join with him in congratulating Mr. Kerr on having safely returned, and they would all be anxious to see the fuller account of his interesting journey which he was now preparing for publication.

Notes on Mont Everest.

By General J. T. Walker, C.B., late Surveyor-General of India.

In his notes on Colonel Tanner's Report in the November number of our 'Proceedings,' Mr. Douglas Freshfield, Sec. R.G.S., repudiates the name "Mount Everest," which has been attached to the highest peak yet measured on the earth's surface, for the following reason:—

"The proper rule seems to be that where a characteristic local name exists it should be kept, and that what may be called personal or monumental nomenclature should be reserved for the nameless summits now frequently the subjects of algebraical arrangements. . . . M. Reclus and the editor of Petermann's 'Mitteilungen,' followed by a large number of Continental geographers, adhere to the high-sounding Gaurisankar in place of 'Mount Everest or 'Everest,' and I propose to use any influence I may possess over the literature of orography in the same direction."

I propose to show how the peak acquired the name of Everest in the first instance, and subsequently that of Gaurisankar.

In 1856, Colonel (afterwards General Sir Andrew) Waugh, Surveyor-General of India, informed this Society that a peak, designated XV. in the official list of the great Himalayan peaks, had been found to be higher than any other hitherto measured in India; that it had no local name which the survey officers had discovered, or were likely to be able to discover while debarred from entering Nepal; that he had always scrupulously adhered to the rule of assigning to every geographical object its true local or native appellation; but here was a mountain, most probably the highest in the world, without any discoverable local name; thus, the privilege, as well as the duty, devolved on him "to assign to this lofty pinnacle of our globe a name whereby it may be known among geographers, and become a household word among civilised nations;" he had determined therefore to name it "Mont Everest" after his late respected chief and predecessor.

Six months afterwards, Mr. B. H. Hodgson, who had resided in Nepal as Political Officer for twenty years, intimated to our Secretary that "the mountain in question does *not* lack a native and ascertained name; that that name is Dévadhúnga, Holy Hill, or Mons Sacer; and that it is expressly referred to under that name in our Journal." Mr. Hodgson at the same time wrote to the same effect to the Royal Asiatic Society, and received the following reply, accepting "Dévadhúnga" and repudiating "Everest":—

"Your letter of the 27th October, together with your observation on the incongruity of assigning a European name to Indian localities already provided with native appellations, was received and read at our last meeting of the 17th instant, and I have the pleasure to inform you that the members present unanimously expressed their concurrence with your view of the case.—E. Norris, *Sec. R.A.S.*"

Thereupon Colonel Waugh convened a Committee of four officers, one of whom was Lieutenant (now Major-General) Tennant, R.E., to report on the subject, which they did very fully, their reports filling several pages of vol. ii. of our 'Proceedings,' 1858.

They came to the conclusion that the identity of Dévadhúnga and Everest was not only doubtful, but far from probable. Mr. Hodgson had written under the belief that Everest was so remarkable a natural object that it would not have been creditable to him, after twenty years' residence in Nepal, had he been unable to identify it; remarkable it doubtless is, from some points of view, but not from any part of Nepal accessible to Mr. Hodgson; at Kathmándu, where he resided, it is probably wholly cut out from view by a great intermediate mountain which culminates in peak XVIII. (height 22,000 feet), and if visible at all, it must be of *apparently* less elevation than that peak. In transmitting the reports of the Committee for publication, Colonel Waugh observed:—

"You will perceive the gist of the question is not whether the mountain should be called Mont Everest, or by its true native name (which is a principle not disputed by any one), but whether it can be called Deodangha without risk of error, in the absence of satisfactory proof that this is really its native name."

In 1862, the Messrs. Schlagintweit published vol. ii., Hypsometry, of their 'Results of a Scientific Mission to India and High Asia,' from which it appears that Hermann Schlagintweit had visited Nepal in 1857, and ascended a hill named Kaulia, a few miles north-west of Kathmándu, whence he saw a distant snow peak which he believed to be Everest and was informed by the natives that its name was Gaurisankar. He says of this peak,—

"I saw it first from the Singhalila range (on the Sikkim frontier) at a distance exceeding 84 miles. The Hindu name I found, when later in Nepal, to be Gaurisankar, Gauri = white or fair, a name of Purváti the wife of Shiva; Sánkar, or Sánkara, one of the forms assumed by Shiva. Gaurisankar is the term in use among the Hindu Pandits of Nepal. The name given to it by the Tibetans, and that by which it is generally known in the northernmost parts of Nepal, is Chingopámari.

"In the Kaulia panorama it is the most eastern peak in the snowy range."

He gives the following further information regarding the name of this peak in vol. iii.:—

"Mr. B. H. Hodgson, who with his well-known scientific energy made numerous inquiries from Darjeeling to ascertain the proper native name of this peak, had the kindness to communicate to me before I came to Kathmándú the following names:—

"*Nepalese.* Devadunga, Bhairab-than, Bhairab-langur.

"*Tibetan.* Gualham, Tangla, Gualham-tangla.

"In his papers on the Himalayan Mountains and Nepal ('Calcutta Government Selections,' 1857, xxvii.) he had printed Nyanam, Dhevadhunga, and Bhairab-langur, as the names then most probable to him.

"However, when in the spring of 1857 my visit to Nepal enabled me to direct my telescope, in the presence of Jhang Bahádur and several of his well-informed

Pandits, to this mountain, which is such a prominent object in most of the views of the Sikkim and Nepal Himalayan crest, they most positively only called it Gaurisánkar, or Chingo-pă-ma-ri in Tibetan; and when then asked about the other names they had mentioned to Mr. Hodgson, they repeatedly averred that they had not so clearly understood which was the particular mountain meant in the previous questions, alluding to the difficulty of finding the exact peak asked for without any other definition than the latitude and longitude."

A panoramic profile of the view of the snowy range from Kaulia (based on horizontal and vertical angles measured with a theodolite), and a chart of the geographical positions of the principal peaks and of Kaulia, are given in Part II. of the Schlagintweit Atlas. The numerical values of latitude, longitude, and height are given as below * in vol. ii., furnishing data which enable the true bearing, distance, and apparent elevation of each peak, as seen from Kaulia, to be readily calculated; and this has recently been done by General Tennant and myself, independently, with the following results:—

Peak.	Azimuth from North. ° ′	Distance in miles	Apparent Elevation. ° ′
XXI.	78 1	59·0	1 57
XX.	79 51	72·7	2 1
XIX.	80 13	78·6	1 48
XV. Everest	82 8	108·6	1 32
XVIII.	84 57	81·3	1 30

On comparing the true bearings with the order of succession of the peaks from left to right, in the panoramic profile and also in the chart, I find that Hermann Schlagintweit has made several mistakes in his identifications. In the profile, XVIII., XIX., and XX. are shown to the left of XXI., which is impossible, and the supposed Everest appears at an angular elevation 10′ above XXI., whereas if visible at all, it should be seen 25′ below; in the chart the ray to Everest falls between the rays to XX. and XXI., which is impossible. Obviously, therefore, Gaurisankar, the easternmost point of his panorama of the snowy range, cannot have been Everest, and the great pinnacle must have lain hidden away from his view by intervening mountain masses. At Kaulia he was not facing the range, but viewing it "end on," so that all the distant eastern peaks

Peak.	Lat. ° ′ ″	Long. ° ′ ″	Height, feet.
XV. or Everest	27 59·3	86 54·7	29,002
XVIII.	27 52·8	86 28·5	21,987
XIX.	27 58·3	86 25·1	23,570
XX.	27 57·8	86 18·3	23,447
XXI.	27 57·5	86 5·5	19,560
Kaulia	27 47·0	85 9·0	6,977
XIII. or Makalu	27 53·4	87 4·5	27,799
Falut	27 13·7	87 59·8	12,042

All the longitudes are 3½′ less than the published G.T.S. values.

appeared nearly in a line with each other; in such a position identification would not be easy even for a person well acquainted with the topography of the country and the varied aspects of the peaks from different points of view, which he was not; he was never within 80 miles of, and, indeed, it is doubtful whether he ever saw, Everest; at Kaulia he was 108 miles west of Everest, with a number of prominent peaks between him and it. He saw a great mountain from his station, Falut, on the Singhalila range on the Sikkim frontier, which he believed to be Everest, and he made a drawing of it, from a point S.E. of, and 1007 feet lower than Falut, which has been well reproduced in colours in a large plate accompanying his volume, and is a very striking illustration of Himalayan scenery. That mountain, however, was not Everest, but another, almost as high, in its neighbourhood, Makalu, of which the summit is the G.T.S. peak No. XIII. The apparent positions of the two peaks, and the distances, from Falut, are as follows:—

Peak.	Azimuth from North. ° ′	Distance in miles.	Apparent Elevation. ° ′
XIV. or Everest	308 22	84·7	1 39
XIII. or Makalu	309 4	72·6	1 54

Thus it is geometrically certain that Everest and Makalu are nearly in the same line from Falut, and that Makalu, though 1200 feet lower, has the greater *apparent* elevation because of the earth's curvature; it must therefore shut Everest out of view from Falut, and still more so from the point whence the drawing was made. This is corroborated by the following remarks of Colonel Tanner's which are taken from the report of the Indian Survey for 1883–4:—

"Sandakphu, on the Darjeeling and Nepal boundary, commands the finest view of Everest that is anywhere obtainable from British territory. The mountain from that place is 90 miles distant, and though so remote, is a fairly striking object, and would appear to better advantage were it not that Makalu, which is 12 miles nearer, to some extent shuts out the view; and as the latter peak is exceedingly bold and picturesque in appearance, it generally comes in for more attention than its higher neighbour. . . . . As one proceeds north along the Sandakphu ridge, Everest gradually becomes hidden behind Makalu, and does not re-appear until the foot of Kabru is approached. . . . . With the exception of the Kinchinjinga peak, No. XIII., or Makalu, is the finest yet fixed in the Eastern Himalayas. It stands apart from the Everest group, and exposes a great mass of snow towards the Sandakphu ridge. From the south, in the plains of Bhagulpur and Purneah, it is the most striking object in the panorama of snow. It has a remarkable cup or hollow which extends for about one-third down its slope, by which it may be recognised.

Falut lies some miles to the north of Sandakphu, and at a rather greater distance from the foot of Kabru, in a position where, according to Colonel Tanner, the view of Everest is hidden by Makalu.

Hermann Schlagintweit gives a geometrical profile of the Falut panorama, showing two peaks which he supposes to be Everest and XIII., the latter under the name of Sibsur, but with the G.T.S.

co-ordinates of XIII.; he makes the horizontal angle between them exceed 5°, whereas the true value is only 42′; his drawing shows something very like Colonel Tanner's "remarkable cup"; he must obviously have mistaken Makalu for Everest and Sihsur for Makalu. Thus his statement that Everest is known to the natives by the name Gaurisankar cannot be accepted.

The native name of the great pinnacle, if it has one, is still unknown to Europeans, as it was thirty years ago. The mountain masses lying between the Bhotia-Kosi and the Arun rivers, of which it is the summit, are known to the Nepalese and Tibetans by the various designations mentioned by Hodgson and Hermann Schlagintweit, and of these, Dévadhúnga—the Home of the Gods—may well be preferred as most in harmony with the religious instincts of the people of the country, and also as known to Indians and Englishmen. But we do not know to what extent of region this name applies, whether to the whole mass, or to a single peak, or, as is most probable, to a group of the most prominent peaks which are seen from Nepal and the British provinces. What Waugh named was the pinnacle itself, not the general mountain mass, and for this reason he called it "Mont Everest," not Mount Everest; it is situated on the back of the range, some distance to the north of the general line of peaks, and from most points of view in Nepalese territory it is not nearly such a prominent object as the more southern peaks, XIII. (S.E. 27,800), XIV. (S. 24,000), XVII. (S.W. 22,800), and XVIII. (W.S.W. 22,000). English geographers have done quite rightly in associating Everest's name with this, the highest point yet measured on the surface of the earth, and Continental geographers who desire to be accurate should follow their example and abandon Gaurisankar.

Whether a higher mountain exists, anywhere, remains to be proved. Mr. W. Graham and his companion Herr Boss claim to have ascended the high peak of Kabru on the Nepal-Sikkim frontier, and from its summits to have seen Everest and two towering peaks on a far distant range beyond, and they believe "the unknown peaks, one rock and one snow" to be the loftier. I have recently had an interview with these gentlemen, and I find that their ideas rest purely on eyesight and conjectural estimates of the relative distances and elevations. Everest is nearly 80 miles from Kabru, and the two peaks were believed to be about as far again beyond; they were less elevated above the horizon, but their appearance was such, that, having regard to their greater distance, it was concluded they must be higher. The only observation taken instrumentally was a bearing with a small pocket-compass to the two peaks, making them "almost due north-west with a trifle west." * Nothing corresponding at all closely to them is to be

* See Mr. Graham's reply to Sir Joseph Hooker, 'Proceedings' vol. vi. (1884) p. 447, on the occasion of the Evening Meeting, June 9, 1884, when he read his paper on "Travels and Ascents in the Himálaya." In the paper itself (pp. 439–40) he

met with in the maps of the Trans-Himalayan explorers; but the "one snow" may very possibly be identical with the "very high snow peak" west of 87° which was seen by Pandit No. 9 on the Tibetan range north of the Dingri plateau, in much the same direction from Kabru, but about 50 miles nearer than estimated by Messrs. Graham and Boss; the "one rock" has no representative on the Pandit's map, though a pinnacle higher than Mont Everest, and so perpendicular as to be bare of snow, must have been a very remarkable object which should not have escaped the Pandit's notice. The two peaks must also lie far to the west of the "two immense mountains very distant," which are noted by Sir Joseph Hooker in his map of Sikkim and Eastern Nepal as having been seen by him from the hill of Bhomtso on the Sikkim-Tibet frontier, and which he was at first inclined to think might be identical with them.*

A special interest attaches to Hooker's observations, as they were the first ever taken to the peaks of the Tibetan range, north of Nepal and Sikkim, which constitutes the remarkable water-parting wherein lie the sources of many rivers which flow down into India, cutting their way through the great Himalayan range. He gives the bearings of the "two immense mountains" and the vertical angle of the highest; but never seeing them again from another point of view, he was unable to determine their distances; he estimated this to be from 80 to 120 miles, and computing with assumed distances of 80, 100, and 120 miles, he got heights of 23,400, 24,660, and 27,304 feet. The mountains have been plotted on sheet No. 9 of the Trans-Frontier map at an assumed distance of 100 miles from Bhomtso, and the highest is marked 24,500 with a ?. It so happens that Hermann Schlagintweit gives a distant peak in Tibet called Langur, with co-ordinates 28° 56′ by 87° 22′, and height 24,660 feet, and the remark "the height, which I obtained in the Kathmandu Residency, is based, I am told, on angles, though very small ones, of the G.T. Survey." Now no officer of the Survey is known to have reached a point from which this peak is visible until within the last ten years; but Hooker's Himalayan Journals were published in 1854, and the co-ordinates and height of Langur must almost certainly have been derived from his observations, as the former correspond very closely with the position, and the latter is identical with the height of his highest mountain at the assumed distance of 100 miles from Bhomtso. The assumption is, however, very doubtful; the maps of the Trans-Himalayan explorers do not show mountains in the corresponding position, but on the contrary,

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states that "North-west, less than 70 miles, lay Mount Everest," and if this bearing had also been taken with his pocket compass it would prove conclusively that some other mountain had been mistaken for Everest, as the true bearing of Everest from Kabru is 290° not 315°. But he informs me that he did not observe Everest instrumentally, and is certain that the two distant peaks appeared over its slope, "further north," as is elsewhere stated in his paper.

* See Sir Joseph Hooker's remarks at p. 425, 'Proceedings,' vol. vi. (1881).

they show the plains of the Sanpo or Upper Brahmaputra valley, with the river running within 10 miles; on the other hand, Montgomerie's map of the Dingri-maidan and Upper Arun river, which was compiled from the surveys of Pandit No. 9, shows a mountain marked "very high" in 28° 41′ by 87° 44′, the bearing of which from Bhomtso is practically identical with Hooker's "true bearing," but the distance is only 65 miles. This is 15 miles less than Hooker's smallest assumption; but considering the admitted difficulty—I should say, impossibility—of estimating such great distances with any exactitude, it must be accepted for the present as indicating the position of the mountain with greatest probability; it also indicates that the height may not materially exceed 22,000 feet.

The Chains of Cassius and Amanus.

By Prof. GEORGE E. POST, M.A., M.D., Syrian Protestant College, Beirût, Syria.

THE following description is based on notes made by the author during two journeys into the region described, in the summer of 1884; the first in company with the late Dr. Dodds, of Lattakia, and the second with Professor Porter, of the Syrian Protestant College at Beirût.

The Nusairy Mountains end in the cul de sac formed by the Orontes, as it sweeps to the west, after emerging from the canyon of Derkush. A low range of hills, trending about S.S.W., parallel to the course of the Orontes after its bend to the west, connects the northern extremity of the Nusairy chain with Mount Cassius, which may consequently be considered as a spur of that range. To a traveller approaching Mount Cassius from the plain of Lattakia, it appears as an almost isolated cone, rising at a steep angle from the sea, and breaking away into the above mentioned chain of hills, in such a manner as to leave a decided gap between the ranges of Cassius and the Nusairy Mountains. The roots of Mount Cassius to the southward are in a chalky ridge, which separates Wady Qondîl from the Lattakia plain. This ridge is about five hours north of Lattakia.

Wady Qondîl is a beautiful valley, at the bottom of which flows a small stream, in which water is to be found all summer. The course of the valley is southward, until within an hour of its mouth, where it is sharply deflected to the west by the chalk ridge above alluded to. The mountains which flank it are covered with a new growth of mostly deciduous leaved trees and shrubs, mingled with pines. The mountain mass which forms the western boundary of Wady Qondîl terminates to the west in a bold headland, called Ras Basît (the ancient Poseidon). This mass is separated from the main body of Mount Cassius by the Wady Kershîsh.

Mount Cassius itself (called in Arabic el Jebel el Aqra', the Bald Mountain) is a limestone cone on the igneous base which underlies the range all the way from Antioch to Wady Qondîl. It is easily accessible on horseback from its eastern, northern, and southern sides, but breaks away very steeply, and in places precipitously, to the sea on the west. I made the height by aneroid 6400 feet. The sides of this mountain, from a level of 2000 feet above the sea, are almost bare of trees, and the lower levels of the range, which were, until within a few years, covered

with a luxuriant forest, are now clothed with a new growth of trees and shrubs, with only here and there a grove of forest trees.

From the top of Cassius, the panorama of the Nusaireh chain, and of the southern part of Amanus, is extremely fine. The sea, at this point of great depth, washes the western base of the mountain, which rises almost precipitously from the water. The valley of the Orontes separates Mount Cassius from Jebel Mousa, the southernmost mass of Amanus. The main road from Northern Syria to the Phœnician plain passes over the range of Mount Cassius from a point about an hour east of Suadiah to Kessab, and thence around the eastern flank of Wady Kershîsh and over the divide into Wady Qondîl, and after passing over the aforenamed chalk ridge, descends into the plain of Lattakia. It was along this road that Alexander's victorious army marched after the battle of Issus, B.C. 333.

Ras el Khanzîr (the Boar's Head) is a bold headland, forming the eastern gate-post of the entrance to the Gulf of Issus. A few rods from the shore of this headland are three rocky pillars, rising abruptly from the sea, like sentinels to watch the passage of vessels entering the gulf from the south. The surface of Ras el Khanzîr shelves so steeply into the sea that it is impossible to pass around its base.

Jebel Mousa is a camel's back ridge, trending nearly eastward from Ras el Khanzîr, at least it is so laid down on some maps. Dr. Hartmann, German Vice-consul at Beirût, thinks that this name is not applicable to any but the southernmost spur of the Amanus chain, and that it does not extend to Ras el Khanzîr, which, according to him, is the south-western end of the Qizil Dagh. The southern face of Jebel Mousa sinks gradually into the valley of the Orontes, while its northern face is precipitous, and overhangs the narrow plain of 'Arsûs (Rhosus). There are few paths over this ridge, and travellers from Suadiah to Iskanderuna usually prefer the more circuitous route by Antioch and Beilân to the shorter and much more difficult mountain paths over Jebel Mousa. Jebel Mousa is separated from the mass of Jebel el Ahmar or Qizil Dagh by a well-marked, though elevated pass. Jebel el Ahmar (the Red Mountain) is well named, as its general colour is brick-red. It is composed of igneous rock, which is overlaid for its northern half by chalk and slaty limestone. The western spurs of this mountain come well down to the sea, and separate the plain of Arsûs from that of Iskanderuna. There is no difficulty in riding over this range from Antioch to the sea, although the passes are not easy enough to be used as ways for commerce. The scenery is very grand in crossing the range. The principal trees are pines and cupuliferæ. The best idea of the individuality of the two mountain masses of the Qizil Dagh and Jebel Mousa is gained during the journey from Suadiah to Antioch, and thence northward to the Beilân Pass. The best panoramic view of both is that from the castle of Antioch.

The Jebel el Ahmar terminates in the Beilân Pass, the highest point of which is about 2000 feet above the sea. This pass, which is the southernmost practicable route for a carriage road, is now crossed by a fine macadamised turnpike. To its north rise the twin peaks of Gesbeldagh and Tasdagh, of which the former (the southernmost) is about 5600 feet high, and the latter about a hundred feet higher. A good bridle-path leads up to the cleft between these two peaks, and from it it is easy to ride to the summit of both. This path commences in the first valley to the east of Beilân, and climbs the western shoulder of Gesbeldagh to its northern extremity, whence it crosses between that peak and Tasdagh. The view from both of these peaks over the valley of the Orontes and the Gulf of Issus is very striking. The Amanus chain to the northward, however, is cut off by the ragged peak north of Tasdagh. The ravine between them is extremely rugged and almost impassable. The only practicable road to the central portion of the chain is that by the shore of the Gulf of Issus, and the Amanian Gates north of 'Osmanîyeh.

Passing northward from Iskanderuna, the road lies by the shore of the Gulf of Issus, through a gradually narrowing strip of coast, until, at a point about an hour and a half from the city, it passes along a beach only a yard wide, at the foot of a gravelly bluff, which is evidently a raised beach. This passage is impracticable in rough weather, and at such times it is necessary to climb over the bluff. A half-hour further on is the Syrian and Cilician Gate. This is a pass over the precipitous end of a spur of the mountain, which comes at this point quite to the sea. The road over this point is about half an hour in length, and near its northern extremity on the left of the road going north, are two columnar fragments of a wall, built with alternate white and black stones. These ruins are known as "*Jonas' pillars.*" North of Jonas' Pillars, the road again descends to the shore. A few rods up the hillside, on the right, opposite to the point where the road again reaches the plain, is the mediæval castle of Merkez (in Turkish, Kizlarkalessi). This castle has been ruined by the growth of trees in the joints of the masonry rather than by the casualties of war. Figs and pomegranates, not Crusaders and Saracens, were the enemies that overthrew this stronghold. The narrow plain of Merkez is crossed at its northern extremity by the river which breaks out of the Amanus at this point. After this the plain gradually widens to the head of the gulf, around which it passes to join the Plain of Issus.

The next stream, in which water is found all the year, is the river of Pajas, a river, which, from its distance from Alexandretta, from the character of its banks, and from the moderate width of the plain across which it flows to the sea, corresponds well with the requisites for the Pinarus, the site of Alexander's memorable battle, while all the other streams that cross the plain north of Pajas, are too far from the Syrian and Cilician Gate, and flow across a plain much wider than it should be to meet the requirements of the battle of Issus.

The mountain chain of Amanus is almost continuous from Gesbeldagh to the Amanian Gates, leading to Hassan Beyley and Baghtché. The lower regions of the mountain are riven by deep gorges, generally impassable, and few paths exist by which a horseman can cross the range. An hour north of Tchai Koi, which is on the Daletchai, a river erroneously supposed by many to be the Pinarus, a long spur of the mountain projects to the westward, and the road by the plain is deflected to the west around the base of this spur. By following woodmen's paths, we climbed on horseback to a height of 4000 feet on this spur, and descended on its north side to 'Osmanlyeh, at the throat of a ravine which nearly cleaves the Amanian chain at this point, but which is too steep for a travelled pass.

The breadth of the range from its southern end to the latitude of 'Osmanlyeh may be ten miles. All the ravines in this portion run nearly due east and west, and there is no passage along or near the ridge by which one can traverse its length on horseback, though there are few places where a good mountaineer could not hold his way on foot at or near the summit, along the southern half of the chain.

Half an hour north of 'Osmanlyeh, the path along the plain joins the carriage road, which traverses the Hassan Beyley Pass. At this point the road begins to turn to the north-east, and then to the east, passing upward in the valley of the stream, which flows down from the amphitheatre around Hassan Beyley.

The Amanian Gates constitute the first pass north of Beilân, practicable for a carriage road and the passage of large bodies of men. The gates consist of a cleft, about six miles broad, extending half-way across the range, from its western border. The southern pillar of the gateway is a bold precipice, above which towers the peak of Kaipokdagh, to a height of 5200 feet. The northern pillar consists of a round-topped wooded hill, the name of which I did not learn. In the middle of the gateway, running from east to west, is a low ridge or spur of the mountain, which

divides the Gates into two valleys or passes, a sort of double door. Down the southernmost of these valleys flows the Hassan Beyley stream, and down the northernmost the Durdikan, and these two streams unite on the plain, and pour their waters into the Jehân.

The amphitheatre in which the southern stream takes its rise is several miles in diameter, and is surrounded to the east and south and west by a mountain wall rising about 2000 feet above the general level of the amphitheatre, which is about 2000 feet above the sea. At the north-east corner of this amphitheatre is Hassan Beyley, which gives its name to the pass. The new carriage road runs through this village, and beyond it over the divide to the Aintāb tableland. We did not go to the height of land but suppose it to be at least 3000 feet above the sea. Hassan Beyley is 2700 feet.

If instead of following the Hassan Beyley road the traveller crosses the ridge which divides the gates into two valleys, he will soon be in the valley of the Durdikan. This valley runs first east until it has fairly entered the chain, and then nearly due north for four hours, dividing the range into two parallel ridges, the easternmost of which is composed of rounded hills, more or less wooded, about 4000 feet high, while the westernmost is continued into three grand masses, called respectively Durbindagh, Banderasdagh, and Ziaretdagh, all about 8000 feet high.

Just above where the Durdikan turns to the west is the village of Bagtché, conspicuous by its minaret and two welys. A road, sometimes used in winter, crosses the eastern ridge at this point.

The Durdikan arises from the eastern ridge of the chain, four hours north of Bagtché. The road follows up the stream to a point near its source. When reduced to a mere rill, the stream makes a sudden bend to the right, while the road keeps on over a pass, 4300 feet above the sea. This pass is called the Khotsch-bell. Just beyond it toward the north is a grassy bank and a spring, called Khotsch-bell-punaré. Passing this fountain, a few rods farther to the north, is a cedar of Lebanon, the southernmost seen by us in Amanus. The cedar has not before been noted in this range. On our return, we found a single tree of the species in a field near a village on the eastern flank of Kaipokdagh; but it was evidently planted there, and not spontaneous. I have searched in vain for cedars south of these localities in both the ranges of Cassius and Amanus.

Soon after passing the cedar tree, the road forks, the eastern branch going through a pass in the eastern ridge, and so down to the plain of the southern branch of the Ak-su. The northern branch turns sharply to the west, and passes through a plain half a mile in length, called Shakir-oghlou-tchivliké. The road then turns again to the N.N.E., and climbs over a ridge 5000 feet above the sea. This pass, which is the highest on the road, is called Madedhing Yoqshih. From a hill above it may be seen the rugged cone of Banderasdagh, the flanks of which are cut into deep ravines, belonging to the watershed of the Jehân. To the north of this pass the road goes steeply down a ravine overshadowed with oaks, beeches (not before noted in Amanus), and the small hazel (*Corylus Avellana* L.). At the bottom of the descent is a plain, about two miles in length and half a mile in breadth, called Buyuk Hudhuning Yazishi. This plain is 4300 feet above the sea. At its northern end the road again rises to a pass, 4700 feet above the sea, called Buyuk Hudhu. In the mountains which surround this plain are many cedars, scattered among pines and deciduous trees. There is also a small grove of them near the centre of the plain. The muleteers assured me that in the forests to the east of this plain cedars are very abundant.

The northern descent of this pass leads into the valley of the Dalé-su, a branch

of the Ak-su, the Marash affluent of the Jehân. The road follows this valley until it opens into the Marash plain.

Two hours north of this pass, and an hour and a half from the mouth of the Dalé-su valley, is the village of Fundajuk, on the eastern flank of Ziaretdagh. Half an hour to the south-west of this is a little village called Déré Gaioura, which is the most convenient point from which to make the ascent of Ziaretdagh. The summit of this peak is three hours from the village. The path is rugged, but for the most part practicable for horses. After rising a thousand feet, the road passes through a scattered grove of cedars, to within 1500 feet of the summit. The largest of these trees measures 25 feet in circumference. The Cilician spruce (*Abies Cilicica*) not before noted in Amanus, is found among the cedars near the summit of this peak.

The summit of Ziaretdagh is 7850 feet above the sea. It consists of a ridge of lamellated slaty limestone, the highest point of which has been converted into a platform by laying a pavement of slabs of rock, and surrounding it by a fence of upright slabs. From the summit of this peak a comprehensive idea of the physical geography of Northern Amanus and Akherdagh can be obtained. The western chain of Amanus is seen to be composed of the three great masses of Ziaretdagh, Banderasdagh, and Durbindagh, which are all rugged peaks, with deep ravines furrowing their flanks. The drainage of this system all works its way into the canyon of the Jehân. Durbindagh is far the most imposing of these three mountain masses, being itself almost a distinct chain of which the westernmost peak is the most rugged, and the easternmost terminates in a bold precipice. According to Captain Bennett, the western face of Durbindagh rises at the Kaya Dûldûl as an almost perpendicular wall between 5000 and 6000 feet in height, directly from the bed of the Jehân.

The northern limit of the Amanus range is defined by the Ak-su, which, arising two days' journey to the north-east of Marash, flows first south-west, nearly to the latitude of Bagtché, and then north-west, until it reaches the northernmost spur of Amanus an hour west of Marash, where it empties into the Jehân.

Vis-à-vis with the northern end of Amanus, and separated from it by the Ak-su, is Akherdagh, a glaring yellow ridge about 20 miles long, running nearly east and west. This range visibly shuts in Syria from the north, and forms a natural boundary to the country indicated by that geographical expression.

No map exists up to the present time accurately representing the topography of the Amanus range north of Iskanderuna. Kiepert's forthcoming map will be no doubt a great advance on his last, and a basis for further details of this most interesting region. It will embody the recent explorations of Dr. Hartmann, German Vice-Consul at Beirût, in Southern Amanus, and the region east and south-east of Antioch, which has been little visited before, and is very imperfectly delineated on Kiepert's map.

GEOGRAPHICAL NOTES.

Mr. Last's Expedition.—We have just received a letter from Mr. Last, informing us of his arrival at the junction of the Rovuma and Lujenda on the 16th of November. He has been able to take several observations to fix the position of this important point; provisionally he gives it as 38° 1′ 52·5″ E. long. and 11° 25′ 20″ S. lat. He intended to start the following day for Blantyre viâ Mtarika's, to verify his watches, and thence proceed to the Namuli Hills.

Bishop Smythies' Walk from the River Shiré to Newala on the Rovuma.—A little pamphlet has been printed at the Universities' Mission Press, at Zanzibar, on a very interesting journey made by Bishop Smythies between the 10th of September and the 24th of October, 1885, from Matope on the Upper Shiré to Newala on the Rovuma, a distance of 450 miles. On leaving Matope, he travelled for a few miles along the left bank of the Shiré, and then struck across for the northern shore of Lake Kilwa. This he traced in its whole extent, from west to east, before he turned north and examined Lakes Chiuta and Amaramba throughout their entire length. He was thus able to complete and verify Mr. O'Neill's sketch survey of the remarkable watershed between Lake Kilwa and the Rovuma basin. As the Bishop observes in a MS. postscript which has been communicated to us, the only apparent differences between his and Mr. O'Neill's observations arise from the different routes taken; for instance, the short river connecting Lakes Chiuta and Amaramba (both now proved to belong to the basin of the Rovuma, and not to that of Lake Kilwa) which Mr. O'Neill, travelling at a distance from its west bank, heard called the Msambiti, the Bishop, keeping close to its eastern bank, heard spoken of only as the Lujenda. Amaramba he looked upon as a wide expansion of the Lujenda rather than as a lake; on the other hand, Chiuta seemed to him to deserve the title of lake; although shallow and swampy in the dry season, it presents a not inconsiderable lake-like expanse in the rains.

The Yáru-Sanpo River of Southern Tibet announced as proved to be the principal Source of the Brahmaputra River and not of the Irawadi.—The *Times* of the 25th of January contains the following telegram, dated Calcutta, January 24th: "The *Calcutta Englishman* states that Mr. Needham, of the Assam Police, and Captain Molesworth, of the Bengal Staff Corps, who left Sadiya on December 12th for Rima in Tibet, have returned to Dibrugarh. They reached Rima, but were unable to enter the place, owing to the hostility of the Tibetans. Having followed the course of the Brahmaputra the whole way from Sadiya to Rima they are able to state authoritatively that the river corresponding in size to the Sanpo, as described by the explorer A—K, falls into it; and that

the identity of the Sanpo with the Deshong may be deemed to be finally settled."—The telegram is not correctly worded; the river seen by Mr. Needham and Captain Molesworth at Rima (or Roema) must have been, not the Sanpo, but the Zayal Chu, the two principal affluents of which, one from the east, the other from the north, were traversed for their entire length by the explorer A—K, as already explained by General Walker ('Proceedings,' 1885, pp. 75 and 327). General Walker pointed out that as the Zayal Chu was known to flow into the Brahmaputra, it could not join the Yáru-Sanpo river of Tibet and flow into the Irawadi, as maintained so long and so stoutly by Mr. Robert Gordon; the identity of the Yáru-Sanpo river with the Dihong (not Deshong) which joins the Brahmaputra river a little below Sadiya, must thus be held as conclusively established.

Coasting Journey along Southern Arabia.—An interesting account of a tour made in December 1884, by Colonel S. B. Miles, our Political Agent at Muscat, along the southern coast of Arabia in H.M.S. *Dragon*, has been recently published by that officer in his report to the Government of India. The object of the trip was to distribute rewards to some of the chiefs for their kindness to the shipwrecked seamen of the steamship *Airy*, which had run aground near Cape Fartak, while bound to Port Said from Bombay. Kesheen was the first place visited by the *Dragon*, and the Sultan stated that the whole Mahra tribe were his subjects, and that his rule extended along the coast from Mesenaat to Ras Thaibat Ali. Sihoot, the next place touched at, is a long straggling town, larger and more thriving than Kesheen, with a population of about 2000. It exports frankincense, salt fish, barley, sardine oil, and shark fins. One of the headmen near Cape Fartak proved to have been rewarded on a previous occasion for having succoured a British crew, that of the *Knight of the Bath*, in June 1883. He said this had raised him from a poor fisherman to the position of a merchant and headman of his village, and the incident and example have had a good effect, the affair having spread far and wide along the coast. At Damkot, in the Bay of El Kamar, none of the natives had even seen a steamer before, though one decrepit old man remembered the boats of the *Palinurus*, which surveyed the coast of Arabia under Captain Haines from 1833 to 1837. Sallala, reached on the 19th of December, is one of the five maritime towns of the district of Dhofar, one of the most fertile and favoured districts on the southern coast of Arabia. The chequered history of Dhofar shows that it has ever been a coveted possession. Extensive ruins of towns and forts scattered over its surface are an attestation of a former populousness and importance. The soil of the plain is light and rich, and excellent water is found everywhere at a few feet from the surface. Cotton, jowari, pulse, lucerne, and coco-nuts are grown, but to a limited extent only. The exports are chiefly frankincense, ghee, hides and skins, wax, &c., brought down from the hills by the Gara Bedouins, besides cotton, sardine oil, and shark fins. The imports are rice, grain, sugar, dates, cotton cloth, and oil, and amount to about 50,000 dollars annually, the trade being mainly in the hands of Khoja merchants, who are agents for houses in Bombay and Maculla. The Samban hills are known to be rich in balsamic, rubber-producing and other useful trees, but they have never been properly explored. The rubber tree grows to a height of 15 or 20 feet, but it has not yet become an article of trade. One of the tribes in this locality, called Garas, is an interesting and peculiar race. They are taller and of a different physique from all the Arab-speaking tribes of Yemen

and Oman. In habits they are pure Bedouins, but not nomadic, and they inhabit caves with which the hills are honeycombed, some of these recesses being of very large dimensions and capable of accommodating a whole family with its possessions in sheep and goats. Merbat, a little town of 300 inhabitants, is about the centre of the frankincense-producing district, which extends through nearly eight degrees of longitude along the southern coast of Arabia, an area comprising the whole of Hadhramaut and part of Oman. The trees are most abundant on the limestone summits of Jebel Samban, where the gum is gathered in May and December by the Garas. One of the last places visited by the *Dragon* was Hellaniyeh, the largest and only inhabited island of the Kuria Muria group. The inhabitants are only thirty-four in number, and are of a primitive and wretched condition.

Cabot Strait, Newfoundland.—The hitherto unnamed strait, which separates Cape Breton Island from Newfoundland, has, with the concurrence of the Governor-General of Canada, been styled on the Admiralty charts, "Cabot Strait," in honour of its discoverers.

M. A. Thouar's Second Exploration of the Pilcomayo.—This young French traveller started from Asuncion last September on a second journey up the Pilcomayo. His object was to study further the navigation of the river and the question of fluvial communication between Bolivia and Paraguay; examining thoroughly the rapids (225 miles from the mouth), which proved an insurmountable obstacle to the expedition of Major Fielding a year ago. According to the *Brazil and River Plate Mail* of January 23rd, he has returned successful, having proved the river to be navigable throughout its entire length.

New German Exploring Expedition to New Guinea.—A party is being organised for the exploration of German New Guinea, on a similar scale to that of Mr. H. O. Forbes in the section under British protection, by the German New Guinea Association, and will start from Hamburg early in February. The command of the expedition has been intrusted to Dr. Schraber, one of the staff of the Hamburg Observatory, who was chief of the scientific expedition sent in 1882 to the southern hemisphere. Six experienced foresters have been already sent on in advance. Fifteen block-houses have been constructed, some at Hamburg, some in Norway, to be put together at chosen points in the district to be explored. Forty Malays have been hired in Java to act as bearers and servants, and five persons trained in various branches of natural science will form the staff of the party. Their explorations will be confined to the portion of the island under the German Protectorate, and will, it is expected, occupy about three years.

The Australian Fly River Expedition.—The safe return of the expedition which was despatched to the Fly river by the Geographical Society of Australasia, was telegraphed from Cooktown, Queensland, on the 25th November last. Rumours, originated by two natives of Samiot, to the effect that the entire party had been massacred, reached Queensland viâ Thursday Island early in November. These

reports received some confirmation from the Rev. Mr. McFarlane, the well-known missionary, he having met Korassa, the chief of Samiot, and obtained from him a circumstantial account of the massacre, which was confirmed by the natives of Bampton Island, at the mouth of the Fly river. We gave no currency to these rumours, as the Papuans are well known to be most untrustworthy, and to possess great ingenuity in patching news together to suit their own purposes. The reports, however, created intense excitement in the colonies; and Admiral Tyson, acting under orders from home, despatched the *Opal* and H.M.S. *Swinger* with four gunboats to the Fly river on 19th November. Meanwhile the schooner *Wild Duck*, fitted up at public expense, had sailed to the same quarter with a relief party of thirty picked men under the command of Mr. F. L. Jardine. Although the immediate necessity for these two expeditions is now happily past, it is believed that they will not return without more thoroughly exploring the whole basin of the Fly river.—The original expedition, under command of Captain H. C. Everill, started on the 17th June last in the small screw steamer *Bonito*, arriving a week later at Thursday Island, whence the steamer was towed to the mouth of the Fly river. Proceeding up the river past Kewei, just below the bar, the party reached Samiot, 2½ miles above the bar, where the river is several miles wide and the tide runs at the rate of five knots an hour. In his last communication (dated 23rd July) Captain Everill spoke of magnificent palms and large sago plantations around the villages. From this point nothing further was heard direct from the expedition until its safe return was telegraphed. From particulars which have recently reached this country we learn that the party succeeded in ascending the Fly river for over 400 miles. Their steamer got ashore several times; once she was aground for eight weeks. At last the water being too shallow for the steamer, some of the party proceeded in a small boat some 60 miles further up the river. For the most part the expedition did not experience any difficulty with the natives; but on one occasion, as the steamer was ascending the river, thousands of natives appeared on the banks, shooting arrows and throwing spears at the party. Fortunately all escaped, but two of the natives accompanying the expedition were panic-stricken and ran away, spreading the report that the party had been massacred. The expedition is reported to have been very successful, but has undergone many hardships. The doctor's skill was in continual demand, as the members suffered much from fever and boils of the most painful description, the latter arising from even the slightest scratch. The expedition has collected over a thousand botanical specimens, including many new species.

The Recent German Census.—The German Statistical Bureau seems to work a little more rapidly than the Registrar-General's Department; already we have some of the results of the census which was taken on December 1, 1885, in the shape of the population of a large number of

German towns. From this it is seen that the rapid increase in population in Berlin has been continued; in 1875 it was 968,635; in 1880, 1,122,230; and in 1885, 1,316,382—or an addition of nearly 200,000 in five years, or an increase of 17 per cent.—3·4 per cent. per annum. In this the suburban population of Charlottenburg, Schöneberg, Rexdorf, &c., is not included. The growth of population in some of the other larger German towns is shown in the following table:—

	1885.	1880.		1885.	1880.
Breslau	298,893	272,912	Barmen	102,921	95,951
Munich	260,005	230,023	Brunswick	85,385	75,038
Dresden	245,550	220,818	Halle	81,869	71,484
Leipzig	170,076	149,081	Dortmund	78,289	67,544
Frankfurt a. M. ..	153,765	136,831	Mulhausen	69,620	63,629
Hanover	137,912	122,843	Posen	68,177	65,713
Stuttgart	125,510	117,303	Mainz	66,314	54,491
Nürnberg	116,193	99,519	Augsburg	65,476	61,408
Magdeburg	114,052	97,539	Cassel	62,950	58,293
Strassburg	112,091	104,471	Mannheim	61,370	53,465
Chemnitz	110,693	95,123	Carlsruhe	56,686	49,283
Elberfeld	106,363	93,528	Lübeck	55,498	51,055
Altona	104,457	91,097			

In 1880 Germany had only eight towns of more than 100,000 inhabitants, now it has fourteen.

Obituary.

Lieut.-General Sir Arthur Phayre, C.B., K.C.S.I., C.C.M.G.*—Arthur Purves Phayre was born at Shrewsbury on the 7th of May, 1812, the son of Richard Phayre, Esq., of that place, and grandson of Colonel Phayre, of Killoughram Forest, Co. Wexford. Though of English birth, Arthur Phayre was thus of Irish family, and always (I think) reckoned himself an Irishman.† There is a tradition among some of his surviving comrades in the Pegu Commission that on some occasion in his career he was offered an opportunity of buying back what had been the patrimony of the family in County Wexford, but he had not the wherewithal to make the purchase. Brothers of Sir Arthur were the Rev. Richard Phayre (whose death occurred a fortnight after his own), and Lieut.-General Sir Robert Phayre, K.C.B., of the Bombay Army; the former older, the latter much younger than Arthur.

Arthur Phayre was for a time at Shrewsbury School, then under the famous master Dr. Samuel Butler (afterwards Bishop of Lichfield), but he went at an early age to India as a cadet, arriving at Fort William the 3rd of February, 1829. He was posted to the 7th Bengal Native Infantry (3rd of June, 1829).

Something has been learned of his early days in India from Sir Robert Montgomery and Mr. John Thornton, who were young civilians of about Phayre's own standing. In 1832 the 7th N.I. was stationed at Gorakhpúr, with a detach-

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* By Colonel H. Yule, R.E., C.B.

† I see, in his letters, he generally writes *will* for *shall*. As he was educated in England this must have been in the blood!

ment thrown out to Azamgarh, a small civil station about 50 miles distant, where Montgomery and Thornton were employed. Phayre, then an ensign, was there, on and off, for some two years, in command of the detachment, and the two young civilians became intimate with him. He was always indifferent to his own personal comfort, and Mr. Thornton remembers that on going first to call upon the young officer he found him lodged, in very primitive fashion, in one of the "bells of arms," * a place which a modern subaltern would hardly look on as a habitable locality in time of peace.

Phayre had no interest, and it seemed likely enough that he would spend his life as an officer of native infantry. But there was much character in him that even then impressed his companions. He had not, as he told them, had much education—a surprising statement to those who knew him in maturity, and always regarded him as a man singularly well educated. But the fact is that he educated himself. In those Azamgarh days he read a great deal, and chiefly in works of substance, on which he exercised his own thoughts, often making notes and abstracts. He was at the same time full of life and intelligence, and had in his solitary reading and meditation formed some odd opinions (as was natural), and delighted in a good argument. Sir Robert tells me that Phayre often spent days and weeks at his house, and in the cold weather joined him in camp—that pleasantest of all modes of life in the memory of those who have experienced it. He was on those occasions (and here none of us will be surprised) a delightful companion; and was very fond of sport, though a very bad shot; the last a feature which I find his Anglo-Burman friends recognise as true to the last.

In 1834 Colonel Benson, who was Lord William Bentinck's military secretary, wrote to Colonel André, commanding the 7th N.I., requesting him to suggest some young officer of promise for employment in the Burmese provinces, which had been acquired a few years before under the treaty that terminated the first Burmese war. These provinces consisted of Aracan, and of what were called the Tenasserim Provinces, stretching far to the south, whilst the delta of the Irawadi (or province of Pegu), remaining in the hands of the Burmese, separated the two. Phayre was nominated, and was sent to Moulmein for employment with a local corps of *Talaings* (or people of Pegu) which it was intended to raise for service in Tenasserim.

Appointment to these local corps was in those days regarded as a sort of novitiate for young officers seeking transfer to the civil administration of "non-regulation" provinces. Phayre, during his short stay in Tenasserim, seems to have made an impression which produced its effect two years later; but the project of a Talaing corps was given up, and he returned to Bengal. After a short service with the Assam Light Infantry, a corps of the same class, he was appointed (30th June, 1837) Senior Assistant to the Commissioner of Aracan, then Captain (afterwards Sir Archibald) Bogle.

Phayre was quite new to civil employment when he came to Akyab (the seat of administration in Aracan), and he had to learn everything from Bogle. But the latter was a good man to learn from. He had made his own name in Assam, where he held charge of Kámrúp, the most important district of that province. The revenue arrangements had been utter chaos when he took charge; but he laboured at the matter till he produced a regular and effective system. "Bogle's Kámrúp

* Sepoys living in huts of their own construction ("lines"), the bells of arms were small square edifices ranged between the lines and the parade, one to each company, and in these the arms of the sepoys were lodged. There being only a small detachment at Azamgarh there was probably a superfluity of these structures.

Settlement" was regarded as a very valuable piece of work, and procured for its author promotion to the Commissionership of Aracan.

Aracan was at that time a most secluded region, and very sparsely populated. A census in 1829, soon after annexation, gave only 121,288 souls, a number which had risen to 195,107 in 1832, and in 1881 to 587,518. The only communication with the outer world in those days was maintained by a sailing vessel—the *Amherst*—which arrived from Calcutta about once in six weeks, affording a periodical excitement.

The only incident that we have been able to gather regarding Phayre's early career in Aracan is connected with an expedition (1841) to chastise a tribe called Wa-lien, in the upper basin of the Kuladan or river of Aracan, which had been committing raids on villages in our territory, retreating to fastnesses in their mountains, which they supposed to be inaccessible to our sepoys. Phayre was sent up with a company of the Aracan Local Battalion, under Lieut. Fytche (who in after years became his successor as Chief Commissioner of British Burma). They were the first European officers to penetrate this wild country; in the face of considerable resistance they scaled the chief stronghold of the Wa-lien, which was on a hill 4000 feet above the valley, and destroyed the village. This made a great impression upon the caterans, and both Phayre and Fytche were highly commended.

The latter two years of Phayre's first stay in Aracan were passed at Sandoway, the southern district of the province, where he must have been in absolute solitude as regards English society. At this time he devoted himself to the study of the Burmese language, and laid the foundation of that accomplishment which he possessed to so high a degree in after years.

From this he was transferred in 1846 to be principal assistant to the Commissioner of the Tenasserim Provinces, Mr. John Russell Colvin, since better known as the Lieut.-Governor of the North-West Provinces, who died in the fort of Agra during the Mutiny.

Major-General Hopkinson supplies a sketch of Phayre about 1841:—

"When I first made his acquaintance he was a tall, gaunt, sinewy fellow, about twenty-eight years of age, with a gentle kindly face, and with a manner which, though not in the least effusive, was cordial and sympathetic to a degree. Phayre was a perfectly sincere and altogether reliable man, but you seldom left him after a long talk without the conviction that he was quite at one with you in your views; the expression of his face, his gestures, the monosyllables to which he confined his responses, all signified assent. There was no reserve in his demeanour, and yet he was reticent."

I transcribe this sketch because it catches some features with singular truth. The adjectives "gaunt and sinewy" were I doubt not strictly correct in his younger days; but the informing spirit, and long exercise of authority had changed this to no little of refinement and dignity when I first knew him (1855). The latter part of the quotation is true to the life, and brings back to me many an occasion in the earlier days of my acquaintance with Phayre. Only this: after a time one recognised the idiosyncracy; you ceased to suppose that he necessarily agreed with you; and with more use, you got at what lay behind his reticence. I think the habit was founded in his unwillingness to enter on controversy, and was perhaps connected with another notable feature in his character. Some circumstances revealed to me that he was naturally a man of hot temper. But never did I know a man who had his temper more perfectly under control, and I doubt if any living man could testify to having witnessed any unseemly breach of that control.

Fourteen years after they had parted at Azamgarh Sir R. Montgomery met Phayre on the Lahore parade ground, as he tells me, practising the goose-step! The

fact was that on the breaking out of the second Sikh war, the 7th N.I. being among the corps ordered to the front, Phayre and other officers of the Commission had been ordered to join; and as he had been so long absent from his regiment he was obliged to go back to the ABC of the drill-ground. Within a few weeks of his return from the Punjab, Mr. Colvin having returned to Bengal, Bogle succeeded in Tenasserim, and Phayre was rewarded with the Commissionership of Aracan (10th April, 1849).

The second Burmese war broke out in the early part of 1852; by the end of that year Lord Dalhousie's proclamation was issued annexing to the British dominions the province of Pegu; and Captain Arthur Phayre was nominated to the charge of the new territory (31st December, 1852), his position being in direct subordination to the Governor-General, with his headquarters at Rangoon. For ten years Phayre governed Pegu as Commissioner, and by his wise and considerate administration laid the foundations of the prosperity which has so singularly characterised that province, and has attracted numerous immigrants from what was till the other day Independent Burma.

Let me quote here from a letter which appeared in the *Times* of the 28th December, written by Dr. Dietrich Brandis, one of the worthiest and most like minded fellow-workers that Phayre ever had:—

"All important questions Phayre approached in the spirit of a scholar, and in forming his conclusions he employed the methods of scientific research. When he had formed his views he acted with the promptitude and boldness of a soldier, and the calm moderation of a statesman. For many years he had been Assistant Commissioner at Moulmein, and afterwards Commissioner of Aracan, so that when he became Commissioner of Pegu his name was well known among Burmans and Karens in the annexed province. His firmness, his justice, his great liberality, his mastery of the language and intimate knowledge of the people, his commanding figure, had made him feared, and popular in the best sense of the word, long before he became Commissioner of Pegu. He was never married, and the Burmans could only explain the pure life which he led by regarding him as a saint, a superior being, a kind of demigod. They worshipped him, and their confidence in him was unbounded."

In 1862 the four provinces of Aracan, Pegu, Martaban, and Tenasserim, embracing a continuous seaboard of 900 miles, extending from the neighbourhood of Chittagong in Bengal to Mergui in the Malay Peninsula, became divisions of the United Province of "British Burma," of which Lieut.-Col. Phayre was constituted the first Chief-Commissioner (and practically governor).

At first, after annexation, Pegu had been greatly disturbed by bands of insurgents and plunderers, just as Upper Burma is at this moment, but they were favoured by a more difficult country in the jungles and endless creeks of the delta. Gradually, however, peace was attained, and the country grew rapidly in commerce and wealth.

We shall presently exhibit an abstract of the capital statistics, borrowed from the last number of the 'Quarterly Review,' which will afford a precise idea of what the growth has been in the province of British Burma. It does not separately distinguish Phayre's term of office, which ended in 1867, but it was he who, by his wise and considerate administration, nursed the province in its infancy. This province had, in the 16th century, been the seat of a splendid empire. War, and barbarous government through many generations, had reduced it to anarchy, and vastly diminished the population. The fertile soil however remained, and the capacity of restoration. It was Phayre who not only laid the foundations of prosperity, but who carried to a great height that prosperity under his own govern-

ment, and gave the impetus to that further development which Pegu has since attained. The extraordinary increase in population, which the figures below exhibit, was mainly due to immigration from beyond our frontier. Let me quote again from Dr. Brandis:—"Though, in 1856, Phayre had no idea that his administration and that of his successors would accomplish so much, the means by which this result has been brought about were clearly set forth in his first report. Among the most prominent of the material benefits gained by the people of Pegu, he recounts the abolition of forced labour, 'a load which bowed the people to the dust;' the introduction of a coin of fixed value; the export of grain, and the abolition of transit duties; and, more than all, just and steady government, and effective repression of crime.

"Phayre was determined from the commencement that the province should pay its way, and should eventually contribute to the requirements of the Indian Empire. In order to effect this, he insisted upon high taxation, and maintained the capitation-tax, which though theoretically objectionable, has wisely been continued to this day, and at the same time he enforced the most rigid economy in the administration. The result has proved that his policy was right. . . . In spite of this high taxation wealth accumulates, and immigration is filling the country. Trade, imports as well as exports, has increased in a most astonishing manner."

It is true, no doubt, that in his task Phayre enjoyed advantages besides those personal ones of which we have recently spoken. There were in Pegu no antagonisms of race or religion to be conciliated, no caste-rivalry, or fanaticism, no important vested rights, no landed or military aristocracy; no difficult land tenure to be investigated. "The whole population of British Burma presented one dead level of equality, which wanted only the assurance of protection to person and property to develope into a more complete form of society. For the government of a people so situated, the most brilliant talent might have produced mischief, if it had been employed in urging too rapid an advance in the path of progress. But by long experience, and loving study, Phayre had become intimate with the character of the material he had to shape, and it will be understood, from what has been said of his qualities, how competent he was for the task." *

The following are the statistics from the 'Quarterly Review':—

"The first attempts at census in Pegu after annexation were of uncertain value, but in 1858, five years after annexation, the population was	890,974
"In 1862 it had risen to	1,244,385
In that year the whole of our Burmese provinces were united.	
In 1863 the whole population of British Burma was ..	2,491,736
In 1872	2,747,148
In 1881	3,736,771 †
"The aggregate *gross revenue* of the three provinces was:—	£
In 1853–54	531,792
In 1862–63	939,667
In 1872–73	1,531,724
In 1883–84	2,850,036
In addition to which, in the last-named year the municipalities raised a revenue of	242,950

* From a note by General Hopkinson, Phayre's successor in Aracan.

† In 1884 the population was estimated to have grown to 4,334,000.

"*Foreign Trade.*—Value of imports and exports for the whole of British Burma:—

	£
In 1853–54	1,643,131
In 1862–63	1,910,993
In 1882–83	10,418,097."

Early in his administration of Pegu Phayre accompanied to Calcutta envoys whom the King of Ava sent, professedly on a complimentary errand with presents, to Lord Dalhousie. They took their leave on the 23rd December, 1854, and on this occasion the chief envoy took courage to make known that his commission was to request the restoration of Pegu. Phayre, as interpreter, had to communicate this to the Governor-General, and those of us who remember that illustrious ruler can picture to ourselves how his stature would enlarge in the eyes of spectators as he gave his answer—in true Dalhousie fashion, and most appropriate to the occasion, addressing Phayre: "Tell them that as long as the sun shines in heaven, the British flag shall wave over those possessions!"

In the following year Phayre in turn went as the Governor-General's envoy to Amarapúra, which was then the royal residence. One object at least of this mission was to obtain a treaty, which should formally cede the territory which we had annexed in the end of 1852. Phayre's negotiations were conducted with great persistence, though in the most conciliatory manner, and he seemed certainly, to all who witnessed the interviews, to have attracted the king's personal goodwill. But H.M. would give no treaty. The reply was, that "after taking into consideration the discussions regarding a treaty, the two great countries having mutually deputed ambassadors with royal letters and presents, and the usual confidence and great friendship having been quickly restored, it was considered unnecessary to make any further special arrangement on the subject."

The king, in fact, was unwilling to do anything which should recognise the annexation. Certain of his royal predecessors are known in Burmese history as "The king dethroned by the Kulás" (or foreigners from India), "The king who fled from the Chinese," and "The king who was thrown into the water;" and H.M. dreaded to go down to posterity as "The king who signed away his best provinces!"

On this mission the writer of this notice had the honour to be Secretary to the Envoy, and from that occasion he dates a friendship and correspondence with his admirable chief, which death alone has interrupted. It may be added that the survivors of that expedition—though I hardly know if I now can use the plural number!—have always looked back upon their social progress up the Irawadi, and their seven weeks' stay at Amarapúra, with its many novel sights and quaint memories, as a bright and joyous episode in life.

Phayre twice again visited the Burmese Court, transferred in 1860 to Mandalay, in the same diplomatic capacity; once in 1862, just after the union of the provinces under him as Chief Commissioner, a change which created much interest at the Court; and again in the end of 1866. On the first occasion a treaty of commerce was concluded; it was one which dealt very gently with the Burmese, and might be called indeed one-sided, in their favour; but the moderate expectations which it held out were never fulfilled. The second mission followed an occasion in which Phayre had dealt in the most friendly manner with the King after a dangerous outbreak at the capital, and it was hoped that H.M. would be more reasonable in regard to the monopolies which he had constituted, and the heavy frontier duties, both destructive to trade. But the King seemed out of temper and broke off the negotiations.

Phayre quitted Burma for ever in March 1867; becoming Sir Arthur, as a

Knight of the Star of India, two months later. The Viceroy (Sir J. Lawrence) offered him the post of Resident at Hyderabad (in succession to Sir George Yule, who has survived him just four weeks), but Phayre declined it. "I thought" (he wrote to me) "I should *make a mess* of an entirely new court and people, so begged to be excused." * In the same letter (from London) he says: "This being really my first stay at home since I originally went to India, I am thoroughly enjoying it. . . . In a few days I go to Paris to present a complete copy of the Buddhist Scriptures (*Bidagát*) to the Emperor, from Bishop Bigandet."

In 1869 he made a trip to India, travelling to Kashmír, Pesháwar and other parts which he had long desired to see, and visiting the Buddhist remains with great interest. When he started, he had certainly not given up the idea of further service in India, for he says (3rd May, 1869): "I am to leave Marseilles 6th June. I have no definite prospect of employment, but many of travel." And he had intended to be absent some two years and a half. But he changed his plans, or found nothing to detain him in India, and he was back in London by the 6th September, 1870, having returned by Saigon, the Chinese ports and capital, Japan, California, the Yosemite valley, the Salt-Lake (where he interviewed Brigham Young), Denver, and so on. "I will only say" (he adds) "I found the men of the Far West, and the Yankees, most pleasant fellows."

About this time he took up his abode at Bray, near Dublin, as headquarters, making visits of six or eight weeks to London in the summer, and then travelling. I have a very pleasant recollection of a meeting with him at the Edinburgh gathering of the British Association in 1871.

In 1872 (22nd May) he writes: "The Burmese Envoy is, I believe, near at hand. I have recommended them at the India Office not to enter on any business-discussion with him, as the object of the Burmese is to throw over the Governor-General. I had a few minutes' conversation with the —— of —— on the subject; but his head is full of the 'Reign of Law,' and such like, and I doubt if he,—or —— ——,—has any decided opinion on the matter. Indeed, at one time they were evidently in danger of falling into the Burmese trap. With all my love for *Mien*,† he must not have his way in all things."

In his next letter, however, he tells that the trap had been entirely eschewed. He adds: "A few days ago I found two young ladies reading your 'Marco' to their father, and they said they read some chapters to him every afternoon."—A fact that may be coupled with the tale told of the late Samuel Warren, that he used to ring up his servants every night and read them a chapter in the 'Lily and the Bee!'

About this time he was much engaged with his history of Burma, and I find several letters from him discussing, and inviting discussion on, the early European narratives regarding Burma, and their geography. In one letter (17th Dec., 1873), he speaks of translating a rubbing from a large Burmese bell in the Liverpool Museum, apparently plunder from Prome in the war of 1824-26: "Oh! if the poor founder, who longed for Nirvána,—and his beloved wife (who, I verily believe—for he was Governor of Pegu—was the old lady we saw at Amarapúra, who knew 'Jan Kan-ning,' and entertained us at tea ‡) could have seen the base use their 'work of merit' was to come to, even the 'sorrow of being,' which they hoped to end at last, would have been an hundredfold enhanced! Well, our looting propensities make me blush for our conduct, which was horrible in the last war."

In September 1874, he writes: "At the India Office, they say we have got into

* Letter dated 2nd April, 1868.

† *Mien* is Marco Polo's name (and the Chinese) for Burma.

‡ See 'The Mission to Ava,' p. 102.

a sad muddle with the King of Burma, and they asked me if I was willing to go out as Plenipotentiary. The question showed they did not know the best way of getting out of the muddle. Such a measure would in my opinion be disastrous; just be doing what the King has all along wanted, viz. to set aside the Government of India."

But at this very time he was appointed by Lord Carnarvon to the Government of Mauritius, and he held this office till the last day of 1878. His success in this government showed how little was local and narrow in the education that Phayre had gone through, from the time of his diligent readings as an ensign, to his successful administration of a great Burmese territory. It is easy to understand how his admirable manners and sympathetic character, as well as his munificent hospitality, should have gained him great popularity among the Creole population; but his remarkable administrative aptitude, with his courtesy and fairness to every class, were not less appreciated. Among the measures which especially employed him during his four years' government, the most important, I suppose, was the new labour law regulating the position and rights of the Indian immigrants, which was long under discussion, and was only finally enacted at the end of his government. Other matters noticed as engaging his attention are the position of squatters on the public lands, whom he was able, by his mode of dealing with them, to convert from a bohemian and almost vagrant population into respectable rate-paying tenants of the crown; sanitary works, which have sensibly improved the health of the island; husbandry of the forests, tending to avert the calamity of general and habitual drought which threatened, before long, to visit the island, if denudation had been allowed to go on unchecked; the initiation, at least, of an irrigation system; and, finally, the thankless task of grappling with departmental economy, which he is alleged to have achieved without exciting discontent. "He has been ever," said the Colonial Secretary on the eve of Sir Arthur's departure from the colony, "the hardest worker of us all; he has taught us the true secret of success, namely, that of doing one's work thoroughly, honestly, and well."

On his homeward route Phayre diverged to visit his friend Sir Bartle Frere, then on his tour to the Transvaal—but that is a region in which we have no desire to linger, even if we had material for expansion.

After his return he settled again at Bray. Every spring or early summer he used to come to town, to the gratification of many old friends, and was generally to be met at the Athenæum, a frequent member of that Oriental table which has so rapidly been losing its most prominent members. It is repeatedly alluded to with hearty enjoyment in his letters. The autumn was usually spent in travelling, or in Scotland, a country to which he had taken a great liking; generally beginning his tour by a visit to his old Burma friend Maj.-Gen. David Briggs at Jedburgh. His history of Burma had long been a labour of love. He had made it the subject of many detached papers (see list below), but after his return from Mauritius he welded these into a book. It is difficult to attract readers to such a subject; but Phayre's work is careful, lucid, and excellent.

His last public utterance was a letter to the *Times* of the 13th October, in which he gave his unhesitating approval to the military intervention for the deposition of King Theebaw which had then been announced: "It has been with much reluctance I have come to the conclusion that British intervention in that country is absolutely necessary and should no longer be delayed. This appears to me essential in the cause of order, and in defence of British interests, political and commercial, now seriously menaced . . . . Intervention should be of such a nature that no other power, European or Asiatic, should be in a position to dispute the predominance of British influence." There could have been no more valuable sanction to the righteousness of that measure. Phayre was not only eminently just, but had

ever been the true friend of the King of Burma, and the most moderate of men in his dealings with that government.

On the evening of the 14th December, he told the lady with whom he lodged that he was suffering pain, and had some local medical advice. He went to his room and lay down, taking only his coat off, and so he was found dead in the morning. He was buried at Enniskerry on the 19th. The announcement of his death was a shock and a surprise. It is true that he was over threescore and thirteen—but who could realise that who saw him, with his alert and youthful figure, in his great stature, slim and lithe as a palm-tree? He is gone; when his counsel seemed most sorely needed, as daily becomes more manifest. Brandis rightly calls him a good and great man. Just, humane, magnanimous, beneficent, animated by an extraordinary sense of duty, courteous, modest—I never remember an instance in which himself, or his claims, or his rights, much less his merits, made any part directly or indirectly in his words or acts,—with the wisdom to build up a state, as he built up a great province. What a contemptible thing seems the oratory on which men set such value and bestow such admiring epithets,—a tool as apt, and as often used, to destroy a kingdom as to build one up,—beside such a combination of qualities as these!

I add a list of Sir Arthur Phayre's published writings, which I believe to be tolerably complete.

In the 'Journal of the Asiatic Society of Bengal':—

1. 1841. Account of Arakan (pp. 34), vol. x. p. 679.
2. 1844. On the History of Arakan (pp. 29), xiii. 23.
3. 1846. The Historical Coins of Arakan (pp. 9), xv. 232.
4. 1856. Original Text and Translation of a Scroll of Silver in the Burmese Language, found in a Buddhist Pagoda at Prome (pp. 6), xxv. 173.
5. 1859. On the History of the Shwé Dagon Pagoda at Rangoon (pp. 8), xxviii. 473.
6. 1860. Remarks upon an Ancient Buddhist Monastery at Pu-gan on the Irawadi (pp. 6), xxix. 346.
7. 1863. Remarks on a Stone Inscription from the Ruins of Pu-gan (pp. 4), xxxii. 267.
8. 1863. Memorandum on some Medals and Coins in the Museum of the Asiatic Society, found near Mergui on the Tenasserim Coast (pp. 30), xxxii. 27.
9. 1864. Memorandum upon some ancient Tiles obtained at Pu-gan in Burmah (pp. 2), xxxiii. 57.
10. 1865. On the History of the Burmah Race (pp. 30), xxxiii. 1; (pp. 41), xxxvii. pt. i. 73; 1869, xxxviii. (pp. 33) pt. i. 29.
11. 1868. On the History of Pegu, xlii. pt. i. 23, 720; xliii. pt. i. 6.
12. 1870. Note on a Circle of Stones in the District of Yusufzai (pp. 2), xxxix. pt. i. 58.

In the 'Proceedings' of the same Society:—

13. 1872. Letter regarding Gold Coins found on the Island of Cheduba. Vol. for 1872, p. 3.
14. 1876. Letter on Stone Weapons from Burma. Vol. for 1876, p. 3.
15. 'Journal of the Society of Arts,' May 27th, 1881. Paper on British Burma.

Separate works:—

1882. Coins of Arakan, of Pegu, and of Burma. Part of the International Numismata Orientalia. 4to., Trübner & Co.

1883. History of Burma, including Burma Proper, Pegu, Taungu, Tenasserim, and Arakan. 8vo., Trübner & Co.

(This sketch has been prepared under difficulties which need not be specified; but let me mention some helps that I have had besides personal knowledge, a packet

of Phayre's letters, and a few public documents. Sir R. Montgomery, Mr. John Thornton, and Major-General Henry Hopkinson have kindly furnished notes. Something has been got from my old friend General Fytche's book called 'Burma Past and Present'; a speech made by Sir Napier Broome, at a dinner given at Mauritius to Phayre before his departure (for which I have to thank Mr. De Robeck of the Colonial Office) has given some particulars as to his government there; and most valuable of all, for a general view of the man, is Dr. Brandis's letter to the *Times*).

Captain Sir Frederick J. O. Evans, R.N., K.C.B., F.R.S.,* late Hydrographer of the Admiralty, was born in 1815. He entered the Royal Navy in 1828 as a volunteer of the second class, and served on the North American and West Indian station in H.M. ships *Rose* and *Winchester*, until appointed to the *Thunder* in 1833. The *Thunder* was a surveying vessel, and it was here that Evans, gifted with a most powerful and accurate memory, a great capacity for method and exactness of detail, and remarkable neat-handedness with pen and pencil, began his career as a hydrographic surveyor. During the three years he was in the *Thunder* he held the two junior ranks of what was then termed the Master's line in the Royal Navy, and was employed as an assistant in the survey of the river Demerara, the coasts of Central America, and the Bahama Banks, taking his share both in the detached boat service and at the chart table.

On leaving the *Thunder* in 1836 he served in the Mediterranean in the *Caledonia* and other vessels, and subsequently on the West Coast of Africa, where we find him assisting in putting down the slave trade, having for four years been detached from the surveying service. This separation arose from the requirements of the service, but apparently it was not one of inclination, for he contributed a paper to the 'Nautical Magazine' on the Hydrography of the West Coast of Morocco.

Having obtained the rank of Master in 1841 he was appointed to the *Fly*, as Master and senior surveying officer. The *Fly* was ordered on special surveying and exploring service in Australia, including an examination of the Barrier Reefs, Torres Strait, and the southern coast of New Guinea. The result of this survey was to render the passage through Torres Strait from and to the Australian colonies, which had been but little known, one of comparative ease and safety; and the colony of New South Wales gave their thanks to the captain and officers of the *Fly* for the valuable hydrographic work so successfully carried out.

Next we find him surveying the Isle of Man, but in 1847 he returned in the *Acheron*, Captain J. L. Stokes, to New Zealand, where the ship was engaged for four years surveying the Middle and South Island. The share Mr. Evans took in this work added much to his high reputation as a scientific surveying officer.

At the commencement of the Crimean War he was appointed to the *Lightning*, in the Baltic, and assisted in the examination of the Aland Islands and approaches to Bomarsund, besides other hydrographic work of great value in aiding the navigation of the fleet. For this he was specially mentioned in despatches by Sir Charles Napier, the commander-in-chief, and personally thanked by him on board the *Lightning*.

In 1855, Evans was appointed Superintendent of the Compass Department of the Navy. Although he had made observations of magnetic dip and intensity in New Zealand, and read all that was generally known of terrestrial magnetism and the deviations of the compass in iron ships, this was but a small preparation for the abstruse work in which he was soon to take a prominent part, respecting armour-plated and other iron ships. Some years previously, the late Mr. Archibald Smith, F.R.S., a mathematician of great eminence, had published mathematical expressions

* By Staff-Commander E. W. Creak, R.N., F.R.S.

for deviations of a moderate amount, but the increasing introduction of iron in the construction of ships and then that of armour-plating our ships of war, rendered further inquiry into their magnetic character necessary.

About this time Evans and Smith became fellow workers and the result was a series of valuable papers on the subject published in the Transactions of the Royal Society, the Institute of Naval Architects, and Royal United Service Institution, between 1858 and 1868, and the third edition of the 'Admiralty Manual for Deviations of the Compass' in 1869. This edition has become a text-book for all nations, being translated into several European languages, and by its instructions and formulæ each source of compass error in the complicated ships of the present day may be eliminated and the proper corrector provided.

In 1862 he was elected a Fellow of the Royal Society, for his valuable contributions to the science of magnetism in iron ships. But magnetism was not destined totally to supplant hydrography as his chief subject of inquiry, for in 1865 he was appointed Chief Naval Assistant to his friend and fellow surveyor in the *Acheron*, Captain G. H. Richards, who had become Hydrographer, and was also placed in charge of the Magnetical Department, with a staff to carry out the system of compass supervision which has done so much for the safe navigation of the ships of the Royal Navy.

As Chief Naval Assistant, he had a principal share in compiling the wind and current charts of the Atlantic, Pacific, and Indian Oceans, and an ice chart for the southern hemisphere, which have added much to the safety of the rapid navigation of those seas by modern steamships, as well as of vessels depending on sail power alone. When the *Challenger* was commissioned for her voyage in 1872, he compiled the magnetical instructions for the guidance of the officers selected for that important branch of scientific inquiry—observations in terrestrial magnetism.

Such varied and good services were happily not left unrewarded, for having become a Staff Commander in 1863, he was promoted to the rank of Staff Captain in 1867, by Order in Council, was retired in 1872 with the rank of Captain, and became a Companion of the Bath in 1873. In 1874, on the retirement of Vice-Admiral Sir G. H. Richards, he was appointed to the important post of Hydrographer to the Admiralty; was created K.C.B. in 1881, and until his final retirement in 1884 carried on the increasing duties of that office with great ability and watchfulness that no neglect of even minor detail should mar the excellence of the work over which he presided.

The Geographical Society has lost a valued adviser and friend to geographical research. Elected a Fellow in 1857, he served on the Council from 1874 to 1879, and was Vice-President from 1879 to 1881. He was President of the Geographical Section of the British Association in 1876. In 1878 he delivered an admirable lecture on "the Magnetism of the Earth," before the Society; and in 1881 contributed a paper to the Geographical Section of the British Association, on Oceanic or Maritime Discovery for the period 1831–1881.

On quitting the post of Hydrographer, he was appointed as one of the British delegates to the International Conference, held at Washington in 1884, to fix a prime meridian and universal day. From this time he gradually declined in health, and died on the 20th of December, 1885, retaining the powers of his vigorous memory in an enfeebled frame to the last.

James Fergusson, Esq., C.I.E., D.C.L., LL.D., F.R.S., &c., &c.*—This distinguished member of many learned societies, long on the Council of the Royal Geographical Society, and one of its Fellows for nearly half a century, died at his house in Langham Place on the 9th January, at the age of seventy-eight. Both an architect and archæologist, instinctively rather than by education, and essentially a man of

* By Major-Gen. Sir Frederic Goldsmid, K.C.S.I.

art and letters, his death has occasioned a gap in the world he frequented which cannot easily be supplied. We know, indeed, of no individual successor on whom his mantle may be said to have fallen, or who can combine in his own person those qualities for which the deceased was so remarkable, and which made him so interesting and original a character. A Scotchman, born at Ayr, and for a time a pupil of the High School, Edinburgh, he is yet known to have received a great part of his early training on southern soil, at Hounslow. That his father, an army surgeon who had seen active service abroad, took up his eventual residence at Windsor, is a circumstance that explains the transfer of his boyhood's home to England. When sufficiently advanced in years and knowledge to work out his own fortune, he went out to the far East, and after some time, started, in conjunction with his brother, a house in Calcutta. It was India, however, not the counting-house, which won his real affections and influenced his tastes; and he took advantage of his vocation there to travel from Presidency to Presidency, and make himself acquainted with its wonderful monuments and inner history. From the first he proposed to give up business so soon as he had earned a competency, and at the proper time he carried out his intention, came to England, and built his house in Langham Place. But the subsequent failure of the Calcutta firm affected him more or less directly, though he had withdrawn his own money from it, and he accepted employment once as General Manager at the Crystal Palace, once as Secretary of an Indian railway, and, again, as a Commissioner under Her Majesty's Government. Fortunately, things righted, and a rise in favour of some Tirhút indigo shares in his possession did him good service. Henceforth, his career became that of a devotee of art; and the results of his travels and researches in India, and briefer sojourn in Palestine, have been embodied in valuable records without which an educated Englishman's library can scarcely be considered complete. Nor is his reputation confined to his own country. If Germany, rather than France, appreciated his peculiar genius, it may be that the Teutonic element is more conspicuous in his writings than the Latin. In Schliemann he seems to have found a true friend, and one who recognised his great ability and originality. He also, we are told, was on his side a consistent supporter of Schliemann.

Mr. Fergusson's published works, while mainly treating of architecture and archæology, contain much to interest the student of history and geography as well as the general reader. Those relating to India are among his earliest and latest. 'Illustrations of the Rock-cut Temples' in that country date from 1845, and these were shortly followed by 'Picturesque Illustrations of Ancient Architecture in Hindustan.' In 1859 he edited Captain Hart's 'Illustrations of the Principal Muhammadan Buildings of Bijapúr,' and in 1866 supplied 'Architectural Notes' to Mr. Hope's descriptions of Guzerat, in a work entitled 'Architecture at Ahmadabad,' doing a like service for Meadows Taylor's two volumes published in the same year;—one on Bijapúr, the other on Dharwar and Maisur. The beautiful book on 'Tree and Serpent Worship' appeared in 1868, and a second edition followed in 1873. 'Archæology in India,' published as late as 1884, if not a mere reply to critics, is certainly a volume elicited by strictures. Its preface and introduction must be of especial interest to the writer's personal friends, from the many passages (perhaps here and there somewhat severely sarcastic) characteristic of his habitual mode of expression; and there is much besides to repay perusal. But the work is too controversial to be read singly as a specimen of the author's powers.

It is not surprising that the topography of Jerusalem, and architecture of the old sacred and secular buildings of the Jews, should have engaged the serious attention of so keen and artistic an observer in his own particular sphere of inquiry. His Essay on the former subject, published in 1847, was followed—as recently

pointed out by Sir Charles Wilson—by his well-known article on Jerusalem, in the 'Dictionary of the Bible,' and, later still, by 'The Holy Sepulchre and the Temple at Jerusalem;' and that, again, by 'The Temple of the Jews, and other Buildings in the Haram Area at Jerusalem.' To the same category of Mr. Fergusson's labours may be added his 'Palaces of Nineveh and Persepolis Restored;' the main object of which volume was an exposition of "the architecture of Western Asia from the earliest period to the age of Alexander."

Among his writings which do not relate exclusively to India or Palestine and countries named in Holy Writ, none are more remarkable than the 'History of Architecture.' Commenced as a Handbook in 1855, it was extended to three volumes in 1866, and further amended and increased to four volumes, in a new edition, published by Murray, 1875. Of these four volumes, the two first contain 'A History of Ancient and Mediæval Architecture;' the third is 'A History of Indian and Eastern Architecture;' and the fourth a 'History of the Modern Styles of Architecture.' Already, before the publication of the later edition, he had declared the object of this, his *magnum opus*, to be: 1st, "To write a universal history of architecture, in which each style shall occupy exactly that amount of space which the extent of its buildings or their merit would appear to justify;" and 2ndly, "To apply one law of criticism to all styles, ancient and modern, eastern and western;" explaining "why one building has been successful or another failed, by a reference to those principles of design in architecture which seem to be universal, and, at all events, are easily understood." In 1849, he published 'An Historical Enquiry into the True Principles of Beauty in Art;' 'Observations on the British Museum, National Gallery, and National Record Office;' and an 'Essay on a Proposed New System of Fortification by Earthworks.' As regards the last, the author's subsequent appointment to be a Member of the Defence Commission of the United Kingdom bears strong testimony to the value set upon his opinion in this important matter. To the above may be added a 'History of Rude Stone Memorials in all Countries' (1872); a 'Short Essay on the Age and Uses of the Brochs and Rude Stone Memorials of the Orkney Islands and North of Scotland' (1877); and the 'Parthenon,' an Essay on the introduction of light into the interior of Greek and Roman temples. But it would take up too much space to attempt a detailed enumeration of Mr. Fergusson's minor writings, whether in separate pamphlets, or for the Journals and Transactions of Societies. Since 1846, and more especially since 1868, he was a frequent contributor to the Journal of the Royal Asiatic Society, the subjects treated bearing chiefly on Indian architecture, chronology, and archæology. His long connection with the said Society had rendered him one of its most esteemed Members and Councillors, and at the period of his decease he was a Vice-President at its board.

From 1863 to 1886, or for 23 years, with the exception of one year (1872), he was on the Council of the Royal Geographical Society, of which he had been a Fellow since 1840, or for nearly half a century. When fulfilling this office, his advice and assistance, always tendered with readiness, were of a most useful and practical kind, whether in advancement of the science to which the Society was dedicated, or in minor details connected with the buildings in which its deliberations were held. If he did not contribute many papers himself to its Journal, he would not fail, when requisite, to join in the discussion of those of others; and, as a proof of the versatility of his talent, he is known to have read a paper at the Geological Society. In 1871 he received the Gold Medal of the Royal Institute of British Architects, and in 1881 he was made a Companion of the Indian Empire.

At the Athenæum and Oriental Clubs, at the Geographical Dining Club, and in many social circles where he was well known and a welcome *habitué*, it will be long before the genial presence and instructive talk of James Fergusson are forgotten.

THE EXHIBITION OF APPLIANCES USED IN GEOGRAPHICAL EDUCATION.

Lectures and Discussions.

Lecture I. December 15th, 1885.—The Right Hon. Lord Aberdare in the Chair.

On the Aims and Methods of Geographical Education.

By E. G. Ravenstein.

Previous to the lecture,

The Chairman said the meeting was held for the practical purpose of seeing by what methods education in geography could be introduced into the schools of England. It was not enough for those present to be persuaded in themselves that a knowledge of geography was necessary to a liberal education: what they wanted, as practical men, was to discover how it could be grafted into the teaching at elementary, intermediate, and higher schools. The Royal Geographical Society had for a long time felt it its duty to encourage the teaching of geography, but hitherto with very slight and partial success. It had already incurred considerable expense, and, with a fair hope of succeeding, it would be inclined to go still further in that direction. He hoped that many of those present would make practical suggestions as to the manner in which the teaching of geography could be extended in England.

Mr. Ravenstein in the course of his lecture* said that while many maintained that the teaching of geography had no educational value, the Council of the Royal Geographical Society very properly insisted that, in the hands of competent teachers, it might become an efficient instrument for training the intellectual powers. Much of the existing misapprehension was due to the inadequate way in which geography was at present being taught in too many instances. Mr. Keltie's admirable report furnished ample illustrations of this fact. Having referred to Text-books and 'Readers,' the lecturer stated that he feared many teachers of geography had lost contact with nature. *Heimatskunde* on the widest bases, which included much more than a mere knowledge of the topography of the environs of the school, should be more largely introduced, in the shape of object lessons. It very largely developed the powers of observation and description, and a child grounded in it would become thoroughly possessed of numerous facts in physical and political geography, meteorology, and even astronomy, without ever having heard the names of these sciences. This elementary course would be followed by a consideration of our earth as a globe, and of the distribution of land and water. The third stage would comprehend a more detailed description of the various countries; and, in conclusion, the pupils would be presented with a systematic survey of general physical and political geography. Ritter's comparative method should be largely used, avoiding the extravagances of some of those who claimed to be disciples of that great geographer. The lecturer then alluded to maps and other appliances. He strongly protested against our schools being converted into establishments for copying maps, but pointed out how the drawing of maps and diagrams might be made useful vehicles of conveying knowledge and testing the intellectual powers. The method of teaching geography was not, however, likely to improve, unless some attention was devoted to the training of teachers. Some of the money now expended upon school fines might

* The Lectures, *in extenso*, with discussions, Mr. Keltie's Report, the Catalogue of the Exhibition, and other documents relating to the action of the Society on the subject of Geographical Education, will be included in a separate volume after the close of the Exhibition.

more profitably be granted to promising teachers in the shape of travelling stipends. Whatever was done, he trusted there would be laid down no hard-and-fast official method. Proper account should be taken of the individuality of teachers, and an intelligent inspector might be trusted to form a correct opinion of the efficiency of the instruction given.

After the lecture,

The Rev. Canon BUTLER said that no doubt all present had suffered from the insufficiency of the methods that were adopted in their youth for teaching geography. One of the first books he ever read which opened his eyes to how geography might be taught was a volume of lectures delivered by Arnold Guyot in America, who had the art of bringing truth before his readers in a very vivid way, dealing not only with facts, but also with principles. He was quite ready to endorse the statement that physical geography had been better taught in this country than political geography, but some foreign manuals treated the subject in a much more thorough and comprehensive way than any English books. He hoped that, before long, any deficiency in that respect would be remedied, and that a series of really valuable books for teaching geography in schools would be published in England. Every one who had been concerned in teaching geography must have been more or less indebted to Kiepert's maps, but perhaps there was ground for the assertion that the improvement of maps had come to a standstill. Some years ago he tried to bring before the University of Oxford the advisability of founding a lectureship or professorship of geography, and suggested that, if there was not work enough in that direction at one University, the professor might alternate between Oxford and Cambridge. With respect to maps, the chief deficiency that he had found was good large maps to illustrate campaigns and battles. The late Professor Vaughan introduced a great deal of physical geography into his historical lectures, and illustrated it by maps drawn by himself. There was nothing artistic about them, but they were very practical. With respect to raised maps, he thought very young persons might be induced to try their hands on them. He had seen young boys make very decent models, and outline whole continents in a very creditable way, hanging the specimens on their walls like so many frescoes. Boys at school could be got to take up the study of geography in a very hearty way, provided it was taught in an interesting manner. The amount of physical science, geology, meteorology, &c., introduced must depend very much on the lecturer. If he were a capable man he would avoid bringing in too many of these matters, but at the same time would avoid making his geographical lectures too dry by keeping too strictly to the old-fashioned method. Reference had been made to the comparative method introduced by Carl Ritter, and he (Canon Butler) had derived great advantage from that author's works, especially his essay on the comparative treatment of geography. The head masters of public schools must all have felt very grateful to the Society for the assistance given to them by the offer of medals for public competition, and he could assert that boys who competed for those medals were not led aside, and did not at all suffer in the general cultivation of their mind by it; while, on the other hand, when they travelled in foreign countries, they were able to observe and record facts in a scientific way, and the knowledge of geography acquired when preparing for the examination was for them of life-long advantage. He therefore regretted that the issue of the medals had been suspended because there was not sufficient competition among the great public schools. He believed the reason of this to be that there was not sufficient encouragement given at the Universities. Some of the best men that he had examined at Oxford seemed to think that battles were fought up in the sky. With a readership in geography and

a resident competent to impart and test geographical knowledge at the University, he thought that any knowledge acquired at the public schools might be continued and carried on, while the masters at the schools would feel that the information their pupils possessed would meet with adequate recognition at the University. Unless that were done, pupils would be attracted by the higher prizes for classics and mathematics, and abandon geography as a thing that did not pay. One aspect of geographical teaching should always be borne in mind, namely, its imperial importance. When the empire was being consolidated, and the federation of the Colonies was being so widely discussed, there must be great opportunities for enterprising geographers and for explorers to go to districts which had not been previously thoroughly examined. In that way he hoped that England would produce a school of young geographers who would be able to deal with all the facts presented to them, and so do honour to the country.

The Rev. H. B. George (New College, Oxford) said his experience with respect to geography had been twofold, first of all as attempting to teach it at Oxford, mainly from its historical rather than its scientific side, and, secondly, as having done a great deal of examining work in schools of the higher grade. With respect to the latter, he looked upon things rather hopelessly at present. The tendency was to leave geography alone, and he believed one reason was that the teachers knew but little about it. Of course the majority of the teachers came from the Universities, where their attention had been directed to other matters. He was ashamed to say that he was almost the only man resident in Oxford University who had lectured on geography, but he had done so in connection with the Modern History School for years past, though he found that due weight was not given to it in the examinations. If geography was to be made a living reality in the upper-grade schools, the place to begin with was the Universities from which the schoolmasters came. He had tried in vain to induce students to realise that they must know what the general physical aspect of the countries was before they could understand, for instance, why Napoleon's campaigns were fought on the Danube or the Po. Students had to be strictly utilitarian in their work, and therefore attended the hardest to things which paid them best, and if they were short of time they did not take great pains to obtain a knowledge of geography. It was necessary to induce the University authorities to attach a little more importance to the subject, and he hoped that the Royal Geographical Society would consider whether it was possible through the schools or otherwise to put pressure on the Universities. If that were done, he believed that the Universities would be induced to move.

Mr. H. W. Eve (University College School) said it had always struck him that an unusual combination was necessary in order to teach geography. The teacher ought to have a very fair amount of scientific knowledge, a strong imagination, and literary power. Mr. Ravenstein thought it best to teach without books, and every good schoolmaster practically did so; but good books were needed to guide them, and for the boys to read. In nearly all existing books the great drawback was the enormous mass of facts; in fact, reading an ordinary geography was not unlike reading a dictionary. People were very apt to forget that it was almost imposible to keep a fact in mind without some association, and geography seemed to have suffered somewhat in the same way as the history of literature had. Titles of works were read, but there was nothing by which they could be hung in the mind except now and then an epigram. He would like to see a geographical book put together in epigrams; it should pick out a few most important features of a country, and leave out everything that it was not very necessary to know. Some good campaigns might be selected for the purpose of teaching geography. He knew no better way of introducing a boy to study the geography of Russia than to take him to

Napoleon's campaigns, and to show the routes by which he could reach the "gates of the East" between the bend of the Dnieper and the bend of the Dwina. A similar observation might be made with regard to General Grant's campaigns in America, and the wonderful defence of Napoleon as he retreated before the Allies closing in upon Paris. The difficulty of teaching some boys mathematical geography was very often underrated, and Mr. Ravenstein must have had singularly hopeful pupils to deal with. He himself found that it took him a very long time before he could get boys of fifteen or sixteen to tell him for certain how high the sun would be at midday on the Tropic of Capricorn. There was a certain difficulty in their conception of anything on a sphere, and in their realising the position of the world in space.

Mr. SWINSTEAD said that about eighteen months ago he was put in a position, at the Stationers' School, Fleet Street, of having to teach geography without knowing anything about it. The boys were not sufficiently advanced to take mathematical geography into consideration, and he started from this, that if a child was to have any notion of geography he must have it in his mind somehow in the way of form. He therefore looked at maps in a very general way, and found that parts of the outlines of every map might be expressed by a few curves. He had constructed rather an elaborate system, and the result had been very successful among his scholars.

Professor HUGHES (Cambridge) said the subject which they were discussing divided itself into two branches, first, the appliances for teaching geography, and secondly, the periods in a boy's career at which he ought to be taught in a particular way. With regard to the appliances, he remarked that although some confusion might occasionally arise from mixing physical and political geography on maps, it must be borne in mind that not only had the relative positions of places to be pointed out, and the methods of getting there, but also what it was desired to call attention to when the person had arrived there. There should not, therefore, be any universal condemnation of what was not strictly erroneous. He entirely agreed with Mr. Ravenstein that the distorted scales of some maps had been of great disadvantage to learners of geography. However much Mercator's projection might in old times have facilitated giving instructions to sailors, it had certainly been in the way of geographers and students, who, when it was used, ought invariably to have the orthographic projection before them at the same time. Of course, he remembered that if relief maps of any district were drawn on a true scale they would not give a correct impression to the observer, who usually saw the mountains from below. From the top of Snowdon, the Isle of Anglesea and North Wales looked perfectly flat, but any one who drove across the country would find it very hilly. The same might be said of the plain of Lombardy, when viewed from the Alps. Therefore a little vertical exaggeration was necessary. Still, the true scale should be as nearly as possible adhered to. Such appliances as maps of the British Empire broken up in pieces on the same sheet should be entirely discarded. They destroyed all the aid to memory given by what Mr. Galton called "visualising." The publications of the Ordnance Survey were very cheap, and but few of them were wanted in a school, for it was not necessary that each pupil should have one. And for sections on a true scale, nothing better could be used than the sections of the Geological Survey, on the scale of six inches to a mile. Then with regard to the time when different subjects should be taught, of course the elementary schools could not be put in order until the schools above them were so, and these latter could not be until the Universities were. But he referred more hopefully than the previous speakers to the present state of geographical teaching in this country. He thought that Cambridge had advanced out of proportion to the advance

of the schools. There were every year one or two courses of lectures on physical geography. One of the favourite subjects in the Cambridge University Extension scheme was physical geography; and there were 7000 students scattered over the kingdom in connection with the University scheme, a very large number of whom had at some time or other gone through a course of physical geography. The tendancy was for men to specialise earlier and earlier. All the geography which could be taught in common as bearing upon history or ethnology or physiography must be taught in the schools, and the special parts of each would be taught at the Universities in different departments. He entirely supported the movement inaugurated by the Royal Geographical Society.

Mr. LANGLER (Westminster Training College) said that the discussion had been on the teaching of the advanced subjects of geography and in connection with advanced schools, but Mr. Ravenstein had dwelt on the subject as affecting the general population of the country. If the great masses of the people were properly instructed in the geography—not the mere topography—of other countries, especially of the British Colonies, the idea of emigration might be popularised. Only the more intelligent of the labouring population were generally those who went abroad; the most ignorant did not, and it would be a great national advantage if the Society would help to diffuse a knowledge of geography amongst the lower classes. That subject was indeed extensively studied in the public elementary schools; problems which affected great circle sailing, or projections, were not necessary for the majority of the pupils in those schools, and he thought that the Society would do well to make popular in magazines and periodicals the ideas embodied in Mr. Ravenstein's lecture and in Mr. Keltie's Report. Could not the medals, or some other reward of a substantial or attractive character be conferred upon the young teachers in elementary schools, so as to encourage among them the study of geography, and thus lead them to give better, or more suitable instruction to their scholars? Such awards could be made, for instance, to candidates at the annual examination for admission to Training Colleges, if the Society could secure the co-operation of the Education Department. Or some other plan might be independently adopted to stimulate the profitable study of this subject which, with our overcrowded population, should be one of increasing interest and importance.

Mr. FRANCIS GALTON thought that a contrivance might be introduced into schools similar to one he had seen in the upper galleries of the Geological Museum in Jermyn Street. A small globe was placed there to represent the sun, and in the opposite gallery, at a distance of 93 feet, under a glass shade, there were hung two small balls to represent the earth and the moon. The whole were made true to scale. The sun was consequently but a few inches in diameter, and the earth was no larger than a large pin's head; the moon being of course still smaller. These two little balls were about three inches apart. A simple fixture of this kind would give to the scholars revelations as to the relative magnitudes and distances of the bodies of the solar system, and they might very easily be fitted up in any school.

The CHAIRMAN said the date of the Exhibition was fixed with reference to the approaching vacation at Board Schools, so that teachers from all parts of the country might examine the appliances. The impression had become pretty general that the value set upon proficiency in any particular subject by the Universities gave it a certain stamp in the educational system of the country; but when it was considered how very small a proportion of the population ever reached the Universities, it would be seen that no effort should be neglected to have a proper system of teaching geography in all schools. From the Report of the Royal Commission on the Great Public Schools, it appeared that only seven per cent. of the scholars at Harrow went on to the Universities. If that was true of a school like Harrow, what must be

the proportion in the rest of the country? Attempts were now being made to form an educational ladder by which children from elementary schools might be able to reach the Universities, and it was therefore certain that the teaching at the Universities must always exercise a considerable influence in other schools; but he quite agreed that it was most important to encourage the teaching of geography at elementary schools. At the present moment he believed that geography was infinitely better taught at the best elementary schools than at the great public schools, with the exception of two or three. He was sure the meeting would heartily thank Mr. Ravenstein for his admirable address, which showed such a thorough mastery of the subject, and such an appreciation of its difficulties; and he congratulated both the audience and the lecturer on the discussion which had taken place. It was a very hopeful first meeting, and he trusted that it would be succeeded by others which would display a growing interest in the subject. The object of the Exhibition was to promote the study of geography, and as he had been President of the Society when Mr. Keltie was sent to the Continent to make the inquiries which had terminated in the Exhibition, he should be disappointed if all the trouble that had been taken was barren of results.

Mr. RAVENSTEIN, after cordially thanking the meeting, said he found that children after two years' instruction in *Heimatskunde* were perfectly able to understand that the earth was a globe, and the meaning of latitude and longitude. Mr. Swinstead's efforts to create a system of teaching geography were most creditable to him, but the method was first introduced fifty years ago by Lohse and Agren, and had been practised with much success. It was, however, a complicated system, and it would be easier to make children remember the degree lines on a map than to learn the ingenious dodges which Mr. Swinstead had introduced.

LECTURE II. December 22nd, 1885.—Mr. FRANCIS GALTON, F.R.S., Vice-President, in the Chair.

On Geographical Appliances. By J. SCOTT KELTIE.

Before the lecture,

The CHAIRMAN said, that a fortnight ago, when the Exhibition was first opened, the President of the Society, the Marquis of Lorne, had stated the circumstances under which it had been called into existence, and the reasons why the Geographical Society had undertaken its superintendence. A week ago, at the second meeting, a most instructive, full, and luminous paper had been read by Mr. Ravenstein, and he (the Chairman) felt sure that all who had heard that excellent address must have gone away conscious of a valuable addition having been made to their geographical knowledge. The meeting held that day was the third of the proposed series, and the subject for the usual lecture was that of geographical appliances, such as those distributed about the rooms, and it was due to the zeal and energy of the lecturer—Mr. Keltie—that visitors were now able to inspect specimens of every kind of geographical appliance in the form of maps, reliefs, and globes, that existed either in England or abroad. Some were simple and gave only a general idea of the subjects with which they were connected, while others entered more into detail. With regard to the maps, some were cheaply got up in the first instance, and others were more expensive; and in this connection he would say that to him it appeared that the original cost of a good design for a map, as distinguished from the cost of reproduction, need be no bar to its being undertaken, because, considering the hundreds of thousands of children to be educated, there must always be a

demand for a really good map. He might mention that the Geographical Society had actually offered to help to defray the cost of particular maps if those directly connected with education could agree precisely on what they required. There were two or three appliances necessary in geographical education which hardly came within the limits of the Exhibition but which still deserved mention. He was very strongly convinced of the necessity of devising some simple forms of laboratory experiments which could be performed before a class, and show the principal processes going on in physical geography. Then there were magic-lantern slides, which formed a very suitable apparatus for effectively bringing home to the conceptions the physical features of the earth. True it was that such appliances appealed only to the sense of sight, but there were other influences capable of imparting geographical knowledge besides the faculty of seeing. One strong instance of this would be found in the case of a very eminent statesman, who blind though he was, delighted above all things to be taken to some elevated point of view and to have the features of the surrounding country described to him. By the duration of ascent he gained an idea of the altitude, and many other incidents of the journey, such as the freshness of the air, the smells, the sounds, and the silence too, all combined to impress his imagination with the geography of the district. Poetical and verbal descriptions of nature, in virtue of the many subtle associations connected with words, were also able to produce extremely vivid effects; and it was a misfortune that some of our greatest poets had possessed but a very meagre acquaintance with geography. That almost inspired man, Shakespeare, was evidently deficient in this respect, as witness his description of the sea, given in "The Tempest," which was absolutely false in every particular. Many of his descriptions of confined areas, such as the Midland Counties, were exceedingly appropriate, but there were no references to the larger aspects of nature. Perhaps our own Poet Laureate was most successful in geographical description. He (the Chairman) would not enter further into detail on the power of happy phrases in awakening the geographical imagination, but would call at once upon Mr. Keltie to read his paper.

Mr. KELTIE, in his lecture, after indicating what ought to be the object of geographical education, pointed out that the appliances used ought to be of use in effecting this object. He then showed the value of taking the pupils outside the school as much as practicable, and teaching at least local geography and elementary physical geography in the open air. As to maps, the principal appliances in geographical education, he pointed out the importance of teaching the pupil to bring out of them all the information they are intended to convey. A list of the apparatus to be found (1) in the geographical class of a German university, (2) in a German high school, (3) in a German elementary school. English maps were then compared with foreign maps in respect of general appearance, accuracy, execution, and suitability for their purposes. Methods of representing physical features were dwelt on, and it was maintained that most of our school maps are too small. In the matter of classical maps, in which we ought to be especially strong, it was shown by examples that we are much behind the Germans, Kiepert's classical maps being generally found in English public schools. Models and relief maps Mr. Keltie valued chiefly as a help to the understanding of ordinary maps. Ideal landscapes he deprecates. In the same way globes and atlases were passed in review, and the value of geographical pictures insisted on. As to telluria, the simpler they are the better, and means should be taken to correct the erroneous notions they are apt to convey. As to text-books, those in use in England are as a rule too large, and too full of bald names to be commited to memory. In conclusion, were there a demand for high-class work in geographical appliances in this country, there is no doubt publishers would be found to meet it.

After the lecture,

Dr. J. H. GLADSTONE said he thought they ought to express their thanks to Mr. Keltie for the admirable way in which he had brought the subject of geographical appliances under their notice. He (Dr. Gladstone) was glad to find he approved of the endeavours of the London School Board to give the children a proper idea of the meaning of a map. The Board had also put into use in their schools some of the very best appliances from the Continent as well as those produced at home, and now very rapid progress in the teaching of geography was being made. He thought a little more credit was due to the recent changes in the Government Code than perhaps the lecturer had given to them. In most of the schools the list of names hitherto required to be learnt by the pupils was not now necessary, which was most satisfactory, inasmuch as they only served to clog their memory to the exclusion of many useful thoughts. Where there was no list of names required it was sometimes usual to insist upon the committing to memory of detailed outlines. Of course memory lessons were valuable, but intelligence ought to be brought into the study of geography, and the memory might come in afterwards. He rather approved of the Government policy in directing that the geography taught should be physical, and not merely political. There was an admirable sentence in the instructions issued to Her Majesty's Inspectors, to the effect that teachers were not expected to impart simply the names of different towns and places on a map, but to give, in addition, some description of historical events, or the productions and manufactures peculiar to them. He trusted that in future more attention would be paid to the teaching of physical geography, and that the processes of building up continents and deepening seas would be made familiar to the inmates of the schools all over the country. Only the previous day he had seen the thing done in one of the poorest schools in London. Nothing had been said in the lecture about the outline maps now published, or Suzanne's globe. This latter was of a dark hue, the aqueous portions being coloured blue. Chalk was used in drawing upon it, which could be readily cleansed off when required. The instrument was very much in use in French schools, and had been introduced experimentally into those of London. He trusted that the various methods of teaching geography recommended by the Royal Geographical Society and other bodies would lead to a more extensive acquaintance with it on the part of the people at large, and its acquirement might be connected more closely with the pursuit of physics and natural science. Among the recommendations lately issued by the Royal Commission upon Technical Education was one that there should be only two class subjects, literature and science, "science" being physical science connected with geography, such as a knowledge of the various conditions of the ocean, air, &c., and of the various products of the earth. He hoped that in the process of time that recommendation would be put into actual practice.

Rev. EDWARD HALE (Eton College) said he wished to join in thanking Mr. Keltie for his information regarding the methods of teaching geography on the Continent. He also thought that all teachers owed a debt of gratitude to the Royal Geographical Society, which was doing everything in its power to promote the study of geography, hitherto so much neglected. He was certain that the teaching of physical geography must be the foundation of any teaching of science, and it was upon those lines that it was taught at Eton, with which he was connected. One of the great difficulties that teachers had to contend with was the uniform size of the maps of all countries. Much that it was expected boys should learn was gained by the use of their eyes, and though there was a scale at the bottom of each map, yet it did not mean much in the sight of the young. What was really wanted was that an outline of Great Britain on the same scale as the map should accompany each map. It was also difficult to convey a proper idea of form without being furnished

with the necessary reliefs, and the supply of these in the higher schools was often miserably inadequate. Indeed, in some of the very best schools in England there would not be found so complete a collection of appliances for teaching geography as was possessed by many of the Board Schools. With regard to the use of models as aids to instructing boys as to the form of various bodies, he was inclined to look upon photographs as the more effective medium. As to physical geography, there was hardly a school in England in which it was taught to any extent or with any success; the reason being that the time of the scholars was so cut up by the various other studies, and the time at the disposal of the masters was so limited, that the teaching of geography in anything like a scientific way was, under present circumstances, almost impossible. In fact, it did not pay to teach it. He hoped it would not be long before the Universities would recognise that the teaching of history without geography was a complete farce, as then teachers might be led to give a proper course of geographical lessons. The blame for this apathy with regard to geography did not rest entirely with the schoolmasters, but with the Civil Service Examiners of the present day, whose examination papers only tested the competitors in their knowledge of the position on the map of a number of plans—a test of memory only. As all the candidates for the Army are examined by the Civil Service Examiners, it follows that our officers, generally speaking, know less of geography than the officers of other European Armies. In some way or other he trusted that this state of things would soon be remedied, but he did not think it would be done unless public opinion was brought strongly to bear upon the examiners.

General Sir BEAUCHAMP WALKER said he entirely agreed with Mr. Hale regarding the inadequate teaching of geography in the schools of the country. For six and a half years he had been Director-General of Military Education, and every effort he made to encourage geography as a vital military subject was thwarted by indifference. The real opposition, however, did not come from the military authorities, but was to be traced to the obstinate prejudice existing in England against the study of geography, especially among the wealthy and influential classes. The reason why maps were so dear here, as compared with the prices charged on the Continent, was that the demand for them was so small that publishers could not afford to circulate them at a less cost, though, given a quick sale, they could produce them as cheaply and as artistically as was done abroad.

Prof. H. N. MOSELEY said he thought the real reason why geography was so neglected in our schools was summed up in the words of Mr. Hale, who had observed that it did not pay to teach it. To give it an impetus, the study should be taken up in the Universities, and at this moment the question was arising at Oxford whether geography should not be ranked as one of the alternative subjects of a preliminary examination which would qualify for entrance on the study of science and certain other special branches of knowledge, and to some extent stand in lieu of moderations. He believed in the learning by heart of a certain amount of the leading features of the topography of the globe, as a framework to aid in the comprehension and retention of the very various and complicated phenomena with which the science of geography had to deal. If marks were given at schools for excellency in drawing maps from memory, instead of for mere proficiency in tracing them from atlases, the results obtained would be far more valuable. The correct insertion of the main features of latitude and longitude should be insisted on in such maps. The knowledge of the main topographical features of the map of the world might with advantage be acquired by every child as a matter of memory, as was the multiplication-table. It would be as fundamentally useful to the child in building up a knowledge of geography, as is the multiplication-table in acquiring a proficiency in arithmetic and mathematics.

Mr. DREW (Eton College) said he thought it would be a difficult thing to carry out Mr. Keltie's suggestion of setting the children to sketch out upon the floor of the school the physical aspects of their district, as to do that forms and desks would have to be removed. The gradual building up of a map on the blackboard, instead of exhibiting it only in its complete form, was an admirable practice. As to the excursions to the Surrey Hills and elsewhere, and some other means mentioned by Mr. Keltie for teaching physical geography, he thought that they could only be taken advantage of by select scholars, and were not capable of being extended to the large numbers in Board schools or even to ordinary Public schools. There was a good deal of force in the lecturer's opinion that the scholar should advance from the known to the unknown, but if that plan was adhered to strictly he did not know how many years a boy would have to remain at school before he became acquainted with, for example, Turkey or Russia. He was sorry to see in some of the maps in the room—especially that of Italy—that the depths of the tints were made exactly in accordance with the heights, thus showing a departure on the part of map-makers from the custom of making the depths to correspond with the steepness of the slope. In the Blue Book on India there was a most beautiful, delicate, and yet effective map of the mountains and rivers of India. He thought there might be two sets of maps and diagrams in use, one to set forth boldly the prominent features of a country, and capable of being easily seen from a distance, the other to give more detail and on a smaller scale, placed so as to be accessible to the pupils. The instruments on view, for affording an idea of the relative distances from each other of the earth, sun, and moon, were of the greatest value, especially that fitted with the screen, as it was a very good method of teaching what was very difficult to convey—the persistence of the axis of rotation and the changing direction of the plane which divided the light from the dark. He hoped that the Royal Geographical Society would not relax its efforts to make geography popular, and it deserved the thanks of all interested in the science for having sent Mr. Keltie upon the expedition the result of which had been just placed before the public. He suggested, in conclusion, that the Society should get constructed in the best style a model of the British Islands and exhibit it permanently in their rooms.

Mr. FRESHFIELD said, since other speakers had congratulated Mr. Keltie on the success of this Exhibition, he felt inclined by way of variation to congratulate the Chairman, for he might fairly say that what had been done had been accomplished to a very great extent through Mr. Galton's persistent and skilful endeavours in keeping the subject of geographical education before the attention of the Society. With regard to relief maps, his belief was that they would not be of much use except in cases where the best works of this kind could be bought and found room for. He did not attach much value to the smaller relief maps used in the Italian and some of the German schools. Their exaggeration was a very serious objection. He thought relief maps would be found most useful, not in giving the picture of any particular locality or country, but as affording typical representations of the plastic features of the earth's surface. At the same time, such a relief map of Italy as that lately published, would be of great assistance to students of history as well as of geography. Had there been such a map in existence when he was at Eton, he might have learnt as a boy many facts since slowly acquired during twenty years' peregrinations. He wished to encourage publishers to produce maps showing the physical features of a country to the same extent and in the same way as relief maps did, for use in primary schools. In his opinion political boundaries should be kept as much as possible off all but specially political maps, for the confusion they caused was one of the greatest hindrances to accurate knowledge. He would like to see every primary school with good maps of the British colonies and a map of the world showing the relative positions of the colonies,

the routes to them, and the time occupied in the voyage. Fear of the unknown was one of the great difficulties encountered in efforts for the better distribution of our population throughout the empire. Illustrations in geographical teaching were hardly done justice to in the Exhibition, and his contention was that photographs of mountains, cañons, sea-coasts, &c., should be used as the material for a thoroughly scientific and artistic series of 'Geographical Illustrations.' In many cases, a view of an actual locality might serve as a type—e.g. Mont Blanc, the Aletsch Glacier, Etna—and he recommended that, where possible, such real views should be selected as more interesting to the student.

REPORT OF THE EVENING MEETINGS, SESSION 1885–6.

Fourth Meeting, 18th January, 1886.—The Most Hon. the Marquis of LORNE, K.T., President, in the Chair.

ELECTIONS.—*Walter Baring, Esq.; John Allan Cunninghame, Esq.; Major Alexander M. Delavoye; William Purdham Goulding, Esq.; Ludovico W. Hart, Esq.; Lucas White King, Esq.; Alexander Macnab, Esq.; Senhor J. A. da Cunha Moraes; John Richardson, Esq.; Alfred Strutt, Esq.; Edward George Stubbs, Esq.; Philip F. Walker, Esq.; E. Calvin Williams, Esq.; Robert Williams, Esq.*

The paper read was:—

"The Hill Slopes of Tonking." By J. George Scott. Will be published with map and discussion in a subsequent number.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—December 4th, 1885: M. ALPH. MILNE-EDWARDS in the Chair.—The Minister of Public Instruction presented to the Society some of the papers which were in the possession of the late M. Huber at the time of his assassination in Arabia. M. H. Chatelain presented a curvimetre, made by his father. By means of this instrument, it is possible to obtain instantly and with great accuracy the measurement of distances on geographical maps and plans without reference to the scale. It makes no difference whether the distances are represented by straight, curved, or broken lines. A letter was read from M. A. Vallon, late Governor of Senegal, and a member of the Society, stating that a map of Guadeloupe, signed E. Devèze (1874), had by chance just come under his notice. This map, to his surprise, he found to be an almost exact reproduction of the map prepared by himself in 1863, a copy of which was in the possession of the Society. The General Secretary said that this letter raised the question, so many times discussed by the Society, of the infringement of copyright as regards maps, and suggested that the Society should take some further steps with regard to the subject. —A communication was read from M. Hangsen-Blangsted regarding the island of Christiansö near the eastern coast of Bornholm, in the Baltic Sea. According to him there is no island of this name in existence, the name having originally been given to fortresses built upon a group of three islands situated about 12½ miles off the east coast of Bornholm. The correct name of this group of small islands

is Ertholmene.—M. M. Venukoff sent some information regarding geographical progress in Russia. The Geographical Society of Russia had just published the numerical results of the levelling of the ground in Siberia from the foot of the Ural Mountains to Lake Baikal, from which it appears that the altitude of the lake is 1540 feet. The same Society had awarded a gold medal to M. Pevtzoff for his explorations in Dzungaria, Mongolia, and the Kirghiz steppes. M. Martin had completed his journey in Siberia, and M. Venukoff forwarded a map of the traveller's routes, giving many new topographical details of the country between the Lena and Amur.—M. R. du Caillaud transmitted two communications, one with regard to the fortress of Tam Giang or Thanh-Mai (Tongking) recently captured from the Black Flags by General Jamont, and the other concerning the Christians in Annam. The latter have been attacked by some of the natives and have, although badly armed, made a good resistance and completely defeated the enemy.—A letter was read from M. Ant. d'Abbadie, of the Institute, dated 27th November, from Abbadia (near Hendaye) enclosing two communications he had received from Major Serpa Pinto. These letters were then read by the General Secretary, the second being dated 26th October, 1885, from Zanzibar. M. Roma du Bocage, Plenipotentiary of Portugal at the Conference for the Delimitation of Guinea, made some explanatory observations with regard to these communications and the object of M. Serpa Pinto's mission, which he said was to explore and study the region separating Lake Nyassa from that portion of the eastern coast occupied by the Portuguese colony.—The Minister for Foreign Affairs forwarded a despach from M. Mancini, French Consul at Asuncion, regarding the new journey of M. Thouar up the Pilcomayo, who had started from Asuncion on 28th September. A copy of a short letter from M. Thouar was enclosed.—Captain Sörensen forwarded a map of Spitzbergen, with corrections made by him from the results obtained during his last voyage, together with a table of meteorological observations.—M. Lucien N. B. Wyse presented on behalf of the author, M. Manuel Uribe Angel, an accomplished native of Colombia, a work entitled 'Geografia general y compendio historico del Estado de Antioquia.' This book was stated to be important as giving an exhaustive description of the physical geography of this little-known State.—M. Levasseur presented a pamphlet by M. Bouley on emigration from Europe, and also laid on the table M. Coudreau's book giving an account of his journey in South America.

——— December 18th, 1885: M. Ferdinand de Lesseps, President, in the Chair.—M. Maunoir read his report on the operations of the Society and the progress of geography during the year 1885. Having alluded to the losses the Society had sustained by death during the course of the year, the Secretary said the Society might congratulate itself on the increase in its collections of books, maps, and photographs. He then referred to the excellent services rendered by Mr. Charles Aubry, who had been the agent of the Society for thirty years, and stated that the Central Commission had asked the Minister of Public Instruction to recognise the services rendered by M. Aubry to the Society. M. F. de Lesseps then conferred upon M. Aubry academical honours, which, he said, were only a just acknowledgment of his services. M. Aubry, who was loudly cheered, briefly returned thanks for the distinction conferred upon him by the Minister of Public Instruction at the instance of the Society. The Secretary then continued his report, reviewing the principal journeys accomplished during the year. (The report will be published as usual in the Quarterly Bulletin.)—In conclusion, M. de Lesseps said a few words on his recent visit to Rheims, where he had inaugurated the new Geographical Committee which had been formed in the Industrial Society of that city.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

ASIA.

Naumann, [Dr.] Edmund.—Ueber den Bau und die Entstehung der japanischen Inseln. Berlin, Friedländer & Sohn, 1885: 8vo., pp. 92. Price 2*s.* 6*d.*

Probably not a few of the Fellows inspected the beautiful series of maps of Japan, which were exhibited in the map-room of the Society recently for some weeks, and which were executed under the care of Dr. Naumann, late Director of the Japanese Geological Survey. This memoir is intended to throw light on these maps, and was prepared for the recent International Geological Congress of Berlin. It is really a very full and systematic account of the geology of Japan, and as it contains the results of Dr. Naumann's own survey work, its value as a contribution to geology and geography is evident.

AFRICA.

Fischer, [Dr.] G. A.—Das Massai-Land. Bericht über die im Auftrage der Geographischen Gesellschaft in Hamburg ausgeführte Reise von Pangani bis zum Naiwascha-See. Hamburg, Friederichsen & Co., 1885: 8vo., pp. 155. Price 6*s.*

In the first half of 1883, Dr. Fischer, who had been settled for some years at Zanzibar, undertook a journey into Masai-land on behalf of the Hamburg Geographical Society. His route was different in the main from that of Mr. Thomson. Starting from Pangani, he skirted the south-west base of Kilima-Njaro, and until he approached Lake Naivasha, he kept well to the north of Mr. Thomson's route. From the lake he was compelled to return. His account of the Masai agrees substantially with what Mr. Thomson and Mr. Johnston have to tell us; he believes that they and the Galla and Somali are essentially of the same stock. His narrative is condensed, but his notes on the geology and natural history of the region traversed are numerous and serviceable. On his journey north he saw the volcano Donyo Ngai at a distance, but passed it close on his return journey, which lay further west than his earlier route. Twice, he says, he saw smoke issuing from it, and gives several statements made by members of his caravan in support of his opinion that it is still to some extent active. This mountain, 7000 feet high, lay some 60 miles west of Mr. Thomson's route. Dr. Fischer gives some useful Masai vocabularies. The scientific collections are described in four appendices:—A. The Rocks, by Dr. O. Mügge (pp. 114–140); B. The Plants, by Prof. H. G. Reichenbach (pp. 141–7); C. The Animals (pp. 148–50); D. The Ethnographical Collections (pp. 151–5). There are a number of illustrations of scenery, three plates of ethnographical objects, and a very good route-map (1 : 1,500,000).

Johnston, H. H.—The Kilima-Njaro Expedition. A Record of Scientific Exploration in Eastern Equatorial Africa, and a general description of the Natural History, Languages, and Commerce of the Kilima-Njaro Region. With six maps and over 80 illustrations by the author. London, Kegan Paul & Co., 1886: 8vo., pp. xv. and 572. Price 21*s.*

The object and general results of Mr. Johnston's expedition are well known to the Fellows of the Society. It will be remembered that he was sent out by the British Association and the Zoological Society to collect specimens of the fauna and flora of the slopes of Kilima-Njaro. How well he performed the duty thus undertaken will be seen from the long lists of animals and plants collected by him, which he gives in the Appendix. A little more than one-half of the volume is occupied with the narrative of the expedition, the incidents of travel from the coast and back, the stay at Mandara's, and other parts of the Kilima-Njaro country, and the two attempts to ascend the mountain itself, on one of which Mr. Johnston succeeded in reaching to within 2000 feet

of the highest summit. So far as it is a story of travel and adventure, it is told skilfully and attractively. As a contribution to the geography of one of the most interesting regions of Africa, it is of much original value, adding much to the facts both of Mr. Thomson and Dr. Fischer. In introductory chapters, Mr. Johnston brings together very fully what was known of the mountain before his visit, and both from the general narrative and in the appended chapters, it will be seen that the additions he has made are considerable. His many weeks' stay on the mountain itself gave him an exceptional opportunity of becoming familiar with its geography, and its varied life, and above all with its interesting inhabitants. In these last, and especially in the Masai, Mr. Johnston took special interest, and this has induced him to make a special study of their ethnology and their language, the very valuable results of which occupy the greater part of the appended chapters. One chapter is devoted to climate, geology, and botany, appended to which is an enumeration of the plants collected, by Prof. Oliver and Mr. J. G. Baker (pp. 337–349). To the zoology another chapter is given, appended to which are, Note on a Nematoid Worm (*Gordius verrucosus*) by Mr. Jeffrey Bell (pp. 364–5); Description of a new Variety of River-Crab of the Genus *Thelphusa*, by Mr. E. J. Miers (pp. 365–7); a List of the Lepidoptera collected, by Mr. Godman (pp. 367–72); on the Insects collected by Mr. Johnston, by Mr. C. O. Waterhouse (pp. 372–7); the Birds, by Captain Shelley and Mr. Johnston (pp. 377–87); the Mammals, by Mr. Oldfield Thomas (pp. 387–94). As we have said, three special chapters are largely devoted to the inhabitants. One chapter (pp. 395–445) deals with the anthropology, the region embraced being that portion of Eastern Africa lying between 1° N. lat. and 5° S. lat., and between the Victoria Nyanza and 35° E. long., special reference being made to the tribes in the neighbourhood of Kilima-Njaro, with whom Mr. Johnston came into personal contact. A long chapter, xx. (446–534) deals with the languages of the region, with special reference to that of the Masai; and the two chapters are a contribution to African ethnology of very great value. On the linguistic chapter, it is evident Mr. Johnston has spent much research; he has evidently made a point of mastering the best authorities on the subject, while striking out a path of his own as to the relation of the languages of the Masai, and the inferences to be drawn therefrom as to the origin of the people. Indeed, he is led into discussing the whole subject of the Bantu family of languages. While admitting the affinities between the Masai languages and the Galla, he is of opinion that the former are to be traced to the basin of the White Nile. Whatever may be thought of his conclusions, his able discussion of the subject must command the attention of workers in this department, and his collection of vocabularies and grammatical specimens will be helpful to students. In his concluding chapter on the commercial prospects of Eastern Equatorial Africa, Mr. Johnston takes a more hopeful view of the future than either Mr. Thomson or Dr. Fischer. To the many beautiful and instructive illustrations the engraver has done justice. The maps are—1. General map of Eastern Equatorial Africa. 2. Route to Kilima-Njaro. 3. Kilima-Njaro to the Coast. 4. Map of Masai Languages. 5. Map of Bantu Languages. 6. Kilima-Njaro and its Vicinity ('Proceedings' R.G.S.).

Wilson, [Col. Sir] Charles W.—From Korti to Khartum: a Journal of the Desert March from Korti to Gubat, and of the Ascent of the Nile in General Gordon's steamers. Edinburgh and London, W. Blackwood & Sons, 1885: crown 8vo., maps, pp. xxvii. and 313. Price 7*s.* 6*d.*

Describes the military events connected with the Expedition for the Relief of General Gordon, under the command of Sir Herbert Stewart, to which Sir Charles Wilson was attached. It includes details of the march across the Desert from Korti to the Nile, by Jakdul and Abu Klea; of the action which occurred here on January 17; of the fight before reaching the Nile; of the attack on Matammeh; of Sir Charles Wilson's reconnaissance, from Gubat as far as Shendy and back in General Gordon's steamers; of the subsequent voyage to the junction of the two Niles; and of the return journey to Korti. The volume, besides, contains an account of the Fall of Khartum, and an appendix. The

maps illustrating the volume are—Sketch map of Vicinity of Khartum, and Sketch of the Country between Dongola and Khartum, on a scale of 35·56 miles to 1 inch.

AMERICA.

Rodrigues, J. C. [LL.B.].—The Panama Canal, its History, its Political Aspect, and Financial Difficulties. London, Sampson Low & Co., 1885: 8vo., pp. viii and 248.

Mr. Rodrigues, an accomplished publicist and statist, went to Panama in 1879, on behalf of the *New York Herald*, to interview M. de Lesseps and judge for himself as to the great canal scheme in its different bearings. The result was to Mr. Rodrigues "a most mortifying disappointment; for the whole project of the great promoter seemed to me to have been undertaken without any serious studies, and indeed without the common precautions taken by any responsible contractor in works of less magnitude." Mr. Rodrigues has since carefully watched the development of the great enterprise and written much about it. His conclusions and the data on which he founds them are contained in the volume. He has evidently studied the whole subject minutely and carefully, and his statement should be studied by those interested in the enterprise. In the course of his investigations much topography is necessarily introduced, so that the volume is not without value to the geographer; it would have been all the more valuable had it been accompanied by maps.

AUSTRALASIA.

Lyne, Charles.—New Guinea. An Account of the establishment of the British Protectorate over the Southern Shores of New Guinea. With illustrations. London, Sampson Low & Co., 1885: 8vo., pp. xii. and 238.

Mr. Lyne acted as representative of the *Sydney Morning Herald* during the proclamation of a British Protectorate over New Guinea by Commodore Erskine in 1884. Along with the commodore he visited Port Moresby, Hall Sound, Motu Motu, Hood Bay, Argyle Bay, Denner Island, and other parts. His account of the ceremony which took place each time the protectorate was proclaimed is interesting, and his observations on country and people, on cannibalism, the labour traffic, and other points, though telling us little we did not know before, present things in new lights, and are therefore useful. The illustrations are good, but there ought also to have been a map.

GENERAL.

Voyékof, A. J.—Snéjny pokrof, ego vliyaniye na klimat i pogódu.—The Snow Covering, its influence on climate and weather; forming part 2 of Vol. xv. of the *Zapiski* of the Imperial Russian Geographical Society. St. Petersburg, 1885: pp. 40.

This contribution to meteorological science by the well-known specialist M. Voyékof, treats of a subject interesting chiefly to his countrymen, who for months in the year are accustomed to see their land covered with snow, and to whom a snowless winter brings many discomforts and privations. Among other points of interest to be noticed in this pamphlet are the facts collected with reference to the influence of Lapland and the Pechora country on Central Russia, showing that the temperature of the air depends on the snowfall.—**[E. D. M.]**

The following works have also been added to the Library:—

Anderson, J. W.—The Prospector's Handbook: a Guide for the Prospector and Traveller in search of Metal-bearing or other valuable Minerals. London, Crosby Lockwood & Co., 1885: 12mo., illustrations, pp. x. and 132. Price 3*s.* 6*d.*

The aim of the author of this useful little volume, who himself is acquainted with the mineral fields of New Zealand, New Caledonia, New Mexico, and

Colorado, is to furnish the prospector as well as the traveller with a guide or handbook, in which the subject is treated in a brief, though as comprehensive a manner as possible. To aid him in attaining this purpose, he has had access to various sources of information on the subject. The Glossary of Terms used in connection with Prospecting, Mining, &c., at the end of the volume, together with the addition of an index, add greatly to the value of the work.

[Canada.]—The Dominion Annual Register and Review, for the Eighteenth Year of the Canadian Union, 1884. Edited by Henry J. Morgan. Toronto, Hunter, Rose & Co.: 1885, 8vo., pp. 501.

Cora, Guido.—Da Brindisi a Bombay. Sguardo Fisico, Politico, Etnografico, Storico, Economico sulla linea di navigazione da Brindisi a Bombay attraverso il Canale di Suez redatto secondo le opere dei più celebri geografi e viaggiatori da Guido Cora. Casale, Tipografia Corrado diretta da P. Bertero, 1869: 8vo., pp. x. and 169.

——— Cenni intorno all'attuale indirizzo degli Studi Geografici. Prolusione letta, il 22 novembre 1881, nella R. Università di Torino, inaugurando il corso di geografia dal Cav. Guido Cora. Torino, Istituto Geografico Guido Cora, 1881: large 8vo., pp. 24.

——— Note cartografiche sulla Reggenza di Tunisi. Supplemento alla Carta speciale della Reggenza di Tunisi, costrutta e desegnata, alla scala di 1: 1,500,000, da Guido Cora. 2ª Edizione. Torino, Istituto Geografico Guido Cora, 1881: large 8vo., pp. 11.

——— Il Sahara, appunti e considerazioni di Geografia fisica. (Estratto dal Bollettino della Società Geografica Italiana, Settembre e Ottobre 1882). Roma, Stabilimento Giuseppe Civelli, 1882: 8vo., map, pp. 31.

Dun Echt Observatory Publications.—Vol. III. Mauritius Expedition, 1874. Division II. Determinations of Longitude and Latitude. Dun Echt, Aberdeen, 1885: 4to., pp. xii. and 519, map and diagram.

This volume forms the second part of the account of the Expedition to Mauritius, undertaken by the Earl of Crawford and Balcarres, for the observation of the Transit of Venus, in the year 1874, and contains full particulars of the determinations of longitude and latitude connected with the Expedition. The contents are as follows:—Chapter I. The Temperature Corrections of the Chronometers. II. Determination of the Longitude of Mauritius by Chronometers—Outward Journey. III. Determination of the Difference of Longitude between Rodriguez and Pamplemousses. IV. Determination of the Difference of Longitude between Belmont and Solitude. V. Determination of the Difference of Personal Equation in finding the Time between Lieutenant Neate, Mr. Burton, and Mr. Gill. VI. Belmont–Pamplemousses Longitude. VII. Determination of the Difference of Personal Equation between Dr. Pechüle and Mr. Gill in finding the Time with their respective Instruments at Belmont, and in recording Telegraphic Signals. VIII. Determination of the Difference of Longitude between Mauritius and Aden by the Transport of Chronometers—Homeward Journey. IX. Belmont–Réunion Longitude. X. Belmont–Seychelles Longitude. XI. Introduction to the Berlin–Aden–Bombay Telegraphic Longitudes. XII. Operations at Bombay. Bombay–Aden Longitude. XIII. Operations at Aden. XIV. Operations at Suez. XV. Connection of the British Transit of Venus Station and Lord Lindsay's Longitude Station at Suez. XVI. Operations at Alexandria. XVII. Operations at Malta. XVIII. Operations at Berlin. XIX. Operations at Dun Echt. XX. Determination of the Latitudes of Suez, Pamplemousses, Belmont, and Alexandria, by Circum-meridian Altitudes. XXI. Determination of the Latitude of Belmont by Observations in the Prime Vertical. XXII. Deduction of the Longitude of Belmont from Transits of the Moon and Occultations of Stars. XXIII. Résumé of the Latitudes and Longitudes with Definitions of the Stations.

XXIV. On the Deviations of the Plumb-Line evinced in the Island of Mauritius. Appendix I. Mean Right Ascensions of the Longitude Stars. II. Mean Places for 1874·0 of the Stars used in finding the Latitude by Circum-meridian Altitudes.

Johnston, Keith.—The London Geographical Series. A Physical, Historical, Political, and Descriptive Geography. Third edition, revised by E. G. Ravenstein, F.R.G.S. London, E. Stanford, 1885: 8vo., maps and illustrations, pp. xiii. and 490. Price 12*s.*

Knollys, [Major] Henry.—English Life in China. London, Smith, Elder & Co., 1885: 8vo., pp. ix. and 333. Price 7*s.* 6*d.*

Major Knollys, who here relates his experiences in China, appears to have been very unfavourably impressed with what he saw. He visited Hong Kong, Shanghai, the river Yang-tsze-kiang (which he ascended as far as Hankow, passing on the way Chinkiang, Nankin, and Kiukiang), and Foochow. In addition to the author's observations on these places he incidentally refers, among other things, to the sport on the Yang-tsze, and in China generally; and also to the social life of the Chinese. There is also a chapter on Medical Missions and the Missionary Question.

Lindley, John.—The Vegetable Kingdom; or, the Structure, Classification, and Uses of Plants, illustrated upon the Natural System. With upwards of 500 illustrations. Third edition, with corrections and additional genera. London, Bradbury & Evans, 1853: 8vo., pp. lxviii. and 918.

Ritchie, J. Ewing.—To Canada with Emigrants. A Record of Actual Experiences. London, T. Fisher Unwin, 1885: 8vo., illustrations, pp. viii. and 269. Price 7*s.* 6*d.*

The author accompanied a party of emigrants to Canada in the spring of last year, his object being "to see the nakedness, or the reverse, of the land, to ask the emigrants how they were getting on, to judge for himself whether it was worth any Englishman's while to leave home and friends to cross the Atlantic and plant himself on the vast extent of prairie stretching between Winnipeg and the Rocky Mountains." The results of his observations, which were originally published in the *Christian World*, are reproduced in the present volume.

Schweinfurth, [Dr.] G.—Linguistische Ergebnisse einer Reise nach Centralafrika. Berlin, Verlag von Wiegandt & Hempel: 1873, large 8vo., pp. 82.

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India.—Statement exhibiting the Moral and Material Progress and Condition of ——, during the year 1882–3. Nineteenth number. Part II. Price 14*s.* (*Stanford.*)

In addition to the letterpress, a vast amount of valuable statistical information is given. There are also twelve maps (on the scale of 1:7,000,000 or 95·8 geographical miles to an inch), which have been specially prepared by Mr. Trelawny Saunders, illustrative of the following subjects:—No. I. The Mountains of India. No. II. The Rivers of India, the River Basins and Oceanic and Inland Watersheds, also the Irrigation Works. No. III. A Map of the Civil Divisions of India, including Governments, Divisions and Districts, Political Agencies and Native States; also the Cities and Towns with 10,000 inhabitants and upwards. No. IV. The Distribution of the Population of India. No. V. A

Map of the Prevailing Languages and Dialects of India and its Borders. Chiefly according to the Indian Census of 1881. No. VI. A Map of India: its Railways, Chief Roads and Trade Routes, Telegraph Lines and Cables, Seaports, Light-houses and Light-ships, Periodical Steamship Routes, Head Post Offices and Circles. No. VII. Military Map of India, showing Divisional and District Commands, Military Headquarters, Stations, Volunteer Headquarters, Depôts, Outposts, Sanitaria. No. VIII. A Map of India, showing at one view the area of each of the Famines since the beginning of the Present Century, and distinguishing the parts slightly, severely, or intensely affected. No. IX. A Meteorological Map of India, showing the Maxima and Minima of Air Temperature and Pressure for 1882; together with the Monthly Resultant of Wind Observations, and the Annual Rainfall for the same period. No. X. The Acreage of the Chief Crops in the British Districts and Native States of India so far as it is supplied by official returns and information. No. XI. The Distribution of Forest Trees in India. No. XII. An Index Map to the Revenue Surveys of British Districts and the Topographical Surveys of Native States in India, on the scale of 1 inch to the mile.

Krakatau.—Der Vulkan ——, vor und nach dem Ausbruch 1883. Nach den Verbeeck'schen Aufnahmen zusammengestellt von T. Metzger. 6 plans and sections. Petermann's 'Geographische Mitteilungen,' 1886, Taf. 2. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Afrique.—La Carte d' ——. Scale 1; 2,000,000 or 27 geographical miles to an inch. Sheets:—No 41, Tabora. No. 42, Zanzibar. No. 45, Livingstonia. No. 46, Kiloua. No. 47, Nosy-Bé. No. 48, Mossamedes. No. 49, Linyanti. No. 50, Tété. No. 51, Quilimané. No. 52, Antananarivo. No. 56, Tullear. No. 57, Ambahy. No. 61, Ile d'Ascension. No. 62, Ile Ste. Hélène. Dépôt de la Guerre, Paris, 1884–5.

These sheets are continuations of the large map of Africa in course of publication by the Dépôt de la Guerre. The present issue includes the Lake district, the south-east coast from the Equator to 22° south latitude, and the islands of Madagascar, Réunion, St. Helena, and Ascension. In addition to the general information contained on each sheet, which in itself is very detailed, and has been brought up to date, several inset maps on an enlarged scale are given of places of special interest. Thus, on sheet 42 there is a plan of Kilima-njaro, on the scale 1:500,000; on sheet 42 a plan of Hellville; on sheet 52, inset maps of Tamatave and Bombetoke Bay; while on sheets 57, 61, and 62, enlarged maps of Réunion, St. Helena, and Ascension are given. Only twenty-three sheets now remain to be published to complete this valuable map of Africa, in which the compiler has taken evident care to consult the best authorities, and to bring his work up to the date of publication.

Afrika.—General-Karte von ——, nach den neuesten Materialien entworfen und gezeichnet von T. Handke. Neue Auflage rev. und ergänzt von G. Herkt. Scale 1:14,500,000 or 198·7 geographical miles to an inch. Glaugau, Flemming, Price 1s. (*Dulau.*)

ATLASES.

England and Wales.—Stanford's Parliamentary County Atlas and Handbook of ——, containing also Geological and Orographical Maps of Great Britain, and Physical, Statistical, and Administrative Maps of England and Wales. With lists of Parishes, Petty Sessional Divisions and Unions, Population Tables, and other particulars relating to County Statistics, Local Administration, and the New Parliamentary Constituencies. London, E. Stanford, 1885.

This atlas contains 89 maps, which, owing to the size of the work (8vo.), are necessarily drawn on a very small scale, but are nevertheless well executed, and sufficiently large to be used for reference in connection with the copious statis-

tical notes which occupy the bulk of the atlas. Among the general maps will be found an interesting series of meteorological maps for each month in the year, on which are shown isobars indicating the mean barometric pressure, and in addition to these are others, exhibiting graphically the distribution of population, occupations in England, Parliamentary representation, &c. On the county maps the new Parliamentary constituencies are clearly shown, and in the letterpress, which accompanies each of these a large amount of useful information is given. The whole atlas occupies no more space than an ordinary book of four hundred pages, and cannot fail to be useful to Members of Parliament, public men, and the officers of local institutions.

Japan.—Atlas von ——. Sieben Blätter im Massstabe von 1 : 1,000,000 or 13·6 geographical miles to an inch, und eine Übersichtskarte im Massstabe von 1 : 7,500,000 or 102·7 geographical miles to an inch; entworfen und gezeichnet von Bruno Hassenstein, Mitredakteur von 'Petermann's Mitteilungen.' Erste Abteilung in 4 Blättern (Sektion I. bis IV.): Süd- und Central-Japan. Price 12*s*. Gotha, Justus Perthes, 1885. (*Dulau & Co.*)

In his preface, Herr B. Hassenstein acknowledges the sources from which he has drawn the information used by him in the compilation of this beautiful atlas. In addition to the topographical features usually exhibited in maps of this class, the compiler has given soundings, extending for some distance from the coast, the fifty-metre line being indicated. The amount of detail given shows the progress the Japanese Government have made during the past few years in the surveys of the country.

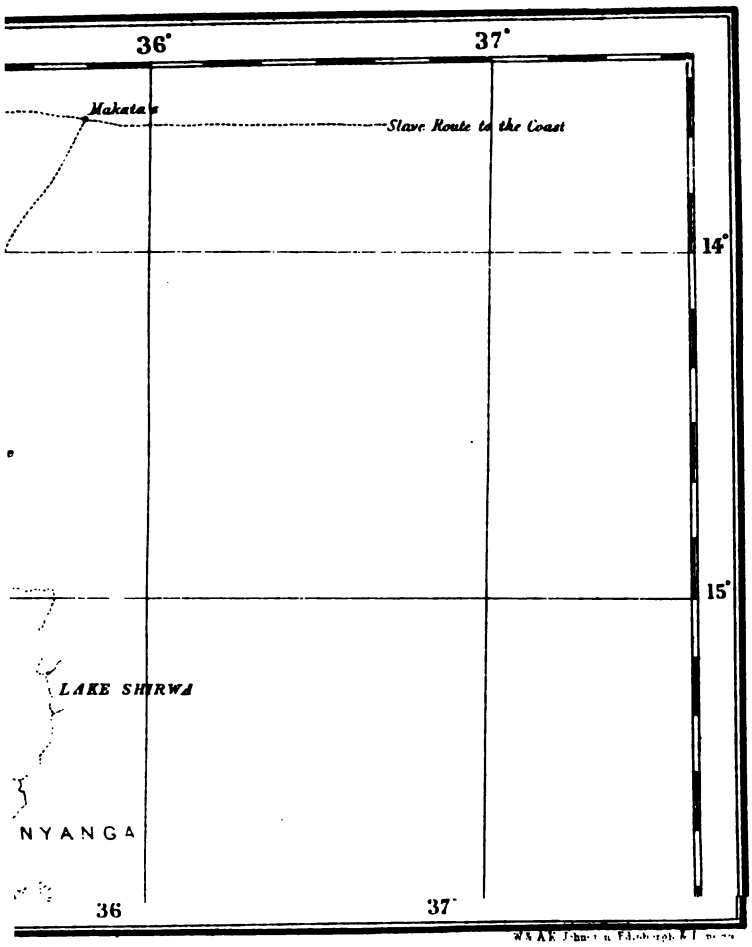
Missions-Atlas.—Katholischer ——. Neunzehn Karten in Farbendruck mit begleitendem Text. Von O. Werner, S.J. Zweite, Verbesserte Auflage. Freiburg im Breisgau, Herder'sche Verlagshandlung, 1885. Price 5*s*. (*Dulau.*)

The following is a list of the maps contained in this atlas:—No. 1. Die Halbkugeln der Erde (Ausbreitung der Katholiken). No. 2. Dänemark, Schweden und Norwegen. No. 3. Balkan-Halbinsel (lateinische Kirche). Nebenkarte: Die Pfarreien in Constantinopel. No. 4. Armenisch-katholisches Patriarchat. No. 5. Syrien, Palästina und Cypern (lateinische Kirche). Nebenkarten: (1) Die Delegationen und die unirten Kirchen im Orient; (2) Jerusalem. No. 6. Vorder-Indien. No. 7. Hinter-Indien nebst den Philippinen und den holländischen Colonien Ostindiens. No. 8. China (östlicher Theil). No. 9. China (westlicher Theil). Nebenkarte: Mongolei. No. 10. Nord- und Centralafrika. No. 11. Südafrika. No. 12. Britisch Nordamerika (Uebersichtskarte). Nebenkarten: (1) Verbreitung der Indianer. (2) Manitoba. No. 13. Die Kirchenprovinzen Quebec, Halifax und Toronto. Nebenkarten: (1) Neufundland. (2) Verbreitung der Indianer. No. 14. Vereinigte Staaten Nordamerikas. No. 15. Westindien. No. 16. Südamerika (Missionen von Quito, &c.). No. 17. Südamerika (Missionen von Paraguay). No. 18. Australien und Polynesien (Uebersichtskarte). No. 19. Südost-Australien.

In addition to the maps, on which are laid down the positions of missionary centres, this atlas contains a large amount of statistical information, which is given in the form of introductory letterpress.

EDUCATIONAL.

Europa.—Wandkarte von ——. Für den Schulgebrauch, von E. Leeder. Scale 1 : 3,700,000 or 50·6 geographical miles to an inch. 9 sheets. Essen, Baedeker. Price 5*s*. (*Dulau.*)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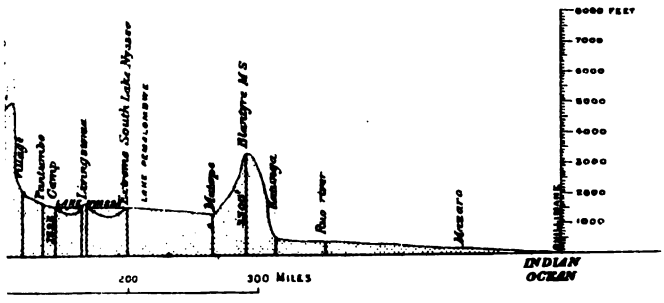
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PROCEEDINGS

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The Herat Valley and the Persian Border, from the Hari-rud to Sistan.

By Colonel C. E. STEWART, C.M.G., C.I.E.

(Read at the Evening Meeting, December 14th, 1885.)

Map, p. 216.

Soon after I had the pleasure of reading a paper to the Royal Geographical Society in 1881, on the subject of the Tekeh Turkomans, I was employed by the Government, on special duty, on the Perso-Afghan frontier, and I proceeded to Khaf, on that frontier, with as little delay as possible, and arrived at that place at an exciting moment. Sardar Ayoub Khan, the rival of the present Amir of Afghanistan, had lately been defeated by the Amir at Kandahar, and had been driven across the Persian border. Ayoub Khan's stronghold at Herat had also been captured for the Amir by Sardar Abdul Kudus Khan. The Amir had then but a slender garrison in Herat, the population of which town was at that time more inclined to favour their late ruler, Ayoub Khan, than the Government of the Amir.

Sardar Ayoub Khan entered Khaf with his defeated followers soon after my arrival at that place. The Persian Governor of Khaf, which is a small town on the border, about 75 miles from the Afghan fort of Ghurian, had only a force of some 150 irregular cavalry at his disposal, so he was unable to keep in order the considerable body of Afghan troops who had taken refuge in his town. They were most unruly, and set the orders of the Persian Governor at utter defiance. The Governor retired into a small fort near Khaf, and I accompanied him. Some of my servants, natives of Persia, who remained in the town, were threatened, the Afghans dancing round them with drawn knives, and the door of the building in which some property of mine had been left was broken open; but before the Afghans could do any further harm they were ejected by the Governor's brother, who heard what was going on, and came to the rescue of my servants. For about a week the small town of Khaf was in utter confusion, the Governor, under orders from Tehran,

directing Sardar Ayoub Khan to move further into the interior of the country, his remaining on the extreme edge of the Persian border and threatening Herat being a breach of neutrality, while Ayoub Khan defiantly replied that he was not going to be dictated to by the Governor and the Englishman, but that he intended to leave Persia altogether and attack Herat. For some time things looked very serious, but at last the Governor directed that no supplies should be sold to any Afghan by a Persian subject; and as this order was strictly obeyed, the Afghans after two days of hunger consented to move on towards Tehran. As soon as a portion of the Afghans had moved out of the town, the Governor, whom I accompanied, re-entered it and restored order, though a considerable number of the Afghans still remained. I stayed at Khaf for some months after this, until matters had settled down.

I had been very anxious to make a rough survey of the country to the southward of Khaf as far as the northern border of Sistan. This country in all maps is marked as being chiefly salt desert, and it had not been passed over in its whole extent by any European. Khanikoff, with the Russian mission which visited Herat in 1861, had passed over a portion of it, and Sir Charles Macgregor had visited a portion; but there remained some 100 miles of the Perso-Afghan frontier quite unvisited by any European, and I was anxious for the sake of geography to fill in this piece of country so as to do away with the blank in maps between the portion surveyed by Sir Frederic Goldsmid's mission to Sistan and the Hari-rud river. This piece of country, though not fertile or inviting, is far from being desert; there is hardly any salt desert at all, one or two narrow strips of salt desert quite insignificant in extent being all that I found. The country is generally mountainous, except close to the Afghan border, where plains of sand or clay are present and the hills are generally of less altitude.

About 18 miles to the southward of Khaf, at a small village named Zuzan, I found the remains of a large town. Heaps of ruins covered a large extent of ground, amongst which men were busily digging the earth for the purpose of extracting saltpetre; to do this they dug up and washed the soil.

In the ruins of most eastern towns saltpetre exists, and is very generally collected. I went over the ruins of Zuzan with an old man who said his ancestors had been here for a great many generations. He said it had been the capital of Persia in ancient times, and pointed out to me the ruins of fortifications. This portion was called the New Palace, and he said it had been built by the Kaian dynasty of Persian kings; but this did not really convey much information, as almost all ancient buildings in Persia are attributed to this dynasty of kings. The ruins covered a very considerable area of ground, and the fortifications were quite traceable but were all of mud, as are most ruins in Persia, except those of very early times. He showed me the Red Garden, where the whole

population, men, women, and children, were led out and slaughtered by order of Chingiz Khan. He said nothing would now grow on that land which had been so thickly watered by blood. The old man was very much disgusted when I told him that Chingiz Khan himself had never been there, but was appeased when I told him that I believed that Zuzan had been destroyed by Tului Khan, the son of Chingiz, in A.D. 1220–21.

After Zuzan was destroyed by the Mongols, it was partly rebuilt by the descendants of Amir Timur. The present fort of burnt brick is evidently of the Timuride period, as is also the handsome mosque with coloured tiles. The arched roof of this mosque had only fallen in a few weeks previous to my arrival. There appears to be a date on this mosque, but, unfortunately, I could not decipher it. The mosque is of large size and solidly built, probably by Shah Rukh, son of Amir Timur. I tried to purchase some coins, but the people digging for saltpetre, declared they never found anything; but I did not believe their statement. Such cruel laws prevail in Persia on the subject of treasure-trove, that any one finding a thing, and even giving it up to the Governors, is ruined, as he is accused of having found much more than he gave up, and of having concealed it, and the matter generally ends in the poor wretch being beaten and his property confiscated. I did secure a few good coins in this part of Persia, but these were almost always purchased from goldsmiths in small towns. The best of them is a daric or stater of King Darius, which I believe is the oldest Persian coin. Every year an immense number of gold and silver coins are melted in Persia which would be priceless to collectors.

I believe that Zuzan is the place mentioned as Susia by Arrian, where Alexander the Great was met by Sartebarzanes, the Governor of Aria. A few miles beyond Zuzan is a range of hills of considerable elevation, called Kyberkuh. The desolation caused in these lands by the Mongol armies in the thirteenth century has never been repaired. I was assured that in the neighbourhood of Zuzan alone, seventy different underground canals which bring water down from the hills can even now be traced, while at the most three or four are at present in good repair and capable of being used.

Another range of hills called Kwajah Shahaz Kuh, and Ahinguran Kuh, rise to a considerable elevation; the highest peak of Kuh Kwaja Shahaz, where there is a shrine visited by pilgrims from considerable distances, was deeply covered with snow, though the weather in the plains below was very hot, and the time of year was towards the end of April. I was not able to take the height of this peak, but it was probably nearly 8000 feet.

I passed through the Ahinguran range by a stony and disagreeable pass, and after several days' march through a hilly country reached the town of Birjand, where the Amir of Kain, Mir Alam Khan, resides.

He governs 9½ baluks or counties of Persia, Sistan being one of these counties. He is a powerful chief and has great local authority.

The Shah has left the Amir of Kain much more independence than he allows the other chiefs of Khorasan. He has a title from the Shah, and has the rank of Amir-i-Toman or Major-General in the Persian army. He is of Arab descent, like a large number of the population of the Kain district. Formerly the seat of government was at Kain, but was removed to Birjand. Birjand is an unwalled town of about 14,000 inhabitants. It has a citadel in very bad repair. The Amirs of Kain are appointed by the Shah, like the chiefs of Tabbas, Bujnurd, Kuchan, Daragaz, and Khaf. They are provincial governors, taking their orders from the Governor-General of Khorasan at Mashad, being removed at the pleasure of the Shah, though a member of the same family is generally appointed.

The whole of the northern portion of the country of the Amir of Kain is very mountainous. The mountains are not generally lofty, the highest peak being about 8000 feet; but the whole country is at a high level, very little of the northern portion being much below 4000 feet, and a considerable portion up to 5000 feet. At one of my camps, not on a mountain, the height of the village was 6500 feet.

The summers are very hot and the winters very cold, snow falling in large quantities and remaining for a considerable period on the higher levels. Towards the south it is bounded by the Lut, or desert, which separates it from Baluchistan and the Persian provinces of Bam and Kárman. On the east it is bounded by Afghanistan, and on the west by the Persian salt-desert and the Tun and Tabbas district of Persia. In the southern portion of the Kain district the heat in the summer months is terrific, and I doubt if greater heat than in some portions of the Lut desert could be registered in any country of the world.

The water supply is very small, and the underground canals in the summer often dry up. Enough grain is not produced in the country for the consumption of the people, and grain is largely imported from Sistan, where the quantity produced is far beyond the requirements of the population. The water supplied by the canals is used largely for growing crops other than grain, which can be exported and sold at a large price. Tobacco, poppy for opium, cotton, and saffron are very largely grown. The crocus blossom supplying the saffron grows better in the Kain district than anywhere else, and the saffron of Kain fetches a higher price than that produced elsewhere, with the exception of the saffron of Kashmir. When I was in Birjand, saffron was selling at about 5*s*. an ounce, but this is far beyond the ordinary price, which is said to be about 2*s*. an ounce.

A much greater proportion of the people are engaged in manufactures than is usual in other parts of Khorasan. In many villages the carpet manufactories are numerous, and employ a number of people, notably at

Durukhs, near which place I passed, and at Gask, which I visited. The carpets of Kain are very brilliant in colour and fine in quality; but they are dyed with aniline dyes and much cotton is mixed with the wool of which they are made, so that these carpets do not last like good Persian carpets, as made in former times. Kurk, a stuff made of the fine under-wool of the goat and known in India as Pashmina, is largely manufactured and exported to Afghanistan and India.

The winter climate being severe, the soft underdown of the goat, like that brought from Kashmir, is produced in considerable quantity. Opium is very largely exported from the districts ruled by the Amir of Kain, and is consumed in the country in enormous quantities. Men, women, and children even, smoke opium to a terrible extent, and I was assured that hundreds of people died annually from the effects of opium.

The Amir of Kain had not been conspicuous for his civility to the mission under Sir Frederic Goldsmid for the demarcation of the frontier of Sistan, but I had no cause to complain. I was received with all courtesy, and every assistance given me in travelling about. I wished to cross the Lut, or desert, which extends to the southward of Birjand towards Kárman. This has only been directly crossed once, I believe, by Europeans since the days when it was crossed by Marco Polo. It was crossed by Khanikoff's Russian mission in 1861, and the account they gave of it was anything but pleasant.

A portion of this desert, at a point where it is not quite so inhospitable as where it was crossed by Khanikoff, was passed by Sir Frederic Goldsmid's mission to Sistan. But I wished to cross it either on Khanikoff's route, or, if possible, a little to the westward. The Amir of Kain sent two of his personal attendants with me, and I left Birjand on the 25th May, 1882. The weather was intensely hot. The first day I marched to Khusf, a flourishing little place of between five and six thousand inhabitants. The stream of water which takes its rise above Birjand flows by Khusf, and on into the desert, where it forms a salt marsh which dries up in summer. In the lower portion of its course it becomes very salt indeed, and its whole bed is encrusted with sheets of salt. The river at Khusf is sunk considerably below the level of the surrounding country, but the high banks are watered by under-ground canals brought from points higher up the river, where it is still fresh. The wonderful patience shown by the Persians in excavating these underground tunnels for water is surprising. Every drop of water has to be bored for and tunnelled for through miles of ground before the precious liquid reaches the field for which it is intended. In this barren land nothing will grow without artificial irrigation.

The next day I marched to Khur, the last inhabited place; I had chosen Khur as my point of departure for crossing the desert, as it is at this point narrower than where crossed by Khanikoff. My route is a little westward of that taken by him. A stream, the waters of

which are very salt, takes its rise from a large marsh near Khur, and this stream is lost in the desert near the point where the Khusf river is also lost. I procured two guides mounted on what were represented to be fast-trotting Baluch camels. The men asserted that they were well acquainted with the road, and could show me two places in the first stretch of 80 miles of desert where there was some brackish water, and in consequence it would not be necessary to carry a large supply of water for men and animals, as Khanikoff had done. Both guides and camels proved to be utter impostors, the guides not knowing the way, and the fast-trotting camels not being able to keep pace with a horse at a walk; and my small party very nearly perished in consequence of trusting ourselves to their guidance.

The first night I sent on one of the guides with my baggage mules to the place called Balabund, where the first water was represented to be, while I started later with two mounted servants and the other guide. When day dawned we were in the desert and the guide declared he did not know the least where he was or where the wells were. The heat was very great and we wandered over low stony ridges for two hours, looking about for the well. At last we stumbled upon our party, resting beside two shallow wells of very salt water at the bottom of a ravine where they had been taken by the first guide, who did know something about the road. We spent a day of the most terrible heat that I ever endured in this ravine. My servants, horses, and mules suffered very much. I did not pitch my tent but raised a thick double blanket on two poles and courted the hot wind from the desert, which resembled the air from a hot-blast furnace.

At five P.M., in spite of the tremendous heat, we started again, though men and animals suffered much. Soon after leaving Balabund we saw an antelope with two kids, the only living thing we encountered in the 80 miles of desert. The sufferings of men and animals was much increased by our thirst forcing us to drink the very brackish water brought from our camp, which was made even more nauseous than it naturally was, as it had been carried in goat-skin bags which had not been properly tanned, and which gave the water a putrid taste. By daylight the next morning we had reached the place, nearly 40 miles distant from our last halting-place, where the second water was said to be found.

Both my guides utterly failed me; one said, "I never was here before in my life, and do not know anything about it." The other said, "I was never here but once, and that was fifteen years ago, and I don't know where the water is." I felt utterly nonplussed; men and animals were quite done by their very long march; it was impossible to go on, and equally impossible to go back. I had a little water left in a half-putrid skin, but our party consisted of thirteen men and as many animals, and it would not have given more than a mouthful apiece, while the burning sun, which later in the day scorched almost like fire,

was rising in the east. One of the horsemen furnished me by the Amir of Kain, though he had never been there before, set to work and found some camel tracks, and we spread over a considerable tract of country, some of us following the bed of a dry torrent. At last, in the bed of the torrent we found three small holes scooped in the sand, at the bottom of which there was some water, nearly the colour of rhubarb and magnesia. We tasted it and it was quite sweet, and I thanked God heartily that we had found it, as few, if any, of our party could have hoped to escape if we had not been guided to this water. We cleared out the holes, and though the water never was more than an inch or two in depth, by dipping it out with a bowl and pouring it into a bucket, we got plenty of water for both men and animals. This water is called Shand Ali Rezah. Shand means a shallow well in the half Baluchi-Persian spoken about here. The heat, though not quite so great as the day before, was really wonderful, and there was a sirocco blowing which threatened to carry away the small and thin tent which was all I had with me. With so fierce a sun overhead, even the best tent would have been no protection. I was glad of the burning wind, though it covered us with dust and sand. The water looked too dirty to wash or bathe in, but its taste was better than its look.

At six P.M. we left the wells. Up to this we had occasionally seen a few bushes, and camels could find a little scanty grazing here and there in the desert; but now vegetation of any sort entirely ceased. At eight miles beyond, we crossed a narrow salt river-bed; there was no water, but the whole bed was covered by a thick layer of beautiful white salt, looking like snow. Twenty miles after leaving the wells, we reached the village of Naiband, which is perched on a hill, a spur of the Naiband range, which we had seen for the last two days. The highest peak is about five miles distant from the village of Naiband. This hill, though it can be seen from a great distance, is not, I believe, more than 6000 feet in height. We arrived a little before midnight, but did not enter the village until next morning, for fear of alarming the people, this place being very much subject to raids by marauding Baluchis. I got a room in the village, and though it was a very poor place, it was a great thing to have a roof of some sort between oneself and the fierce sun which blazed on this desert land. Naiband is a village of about 400 inhabitants, and there is a small stream of good water, but the amount of ground fit for cultivation is very small indeed. The principal product of the place usually is dates. Though there were plenty of date-palms, there had been no crop of dates for several years, in consequence of a heavy fall of snow, which had nipped all the palms, and killed many of them. It seems inexplicable that a place with such a torrid summer temperature should ever have a heavy fall of snow; but though it is unusual, snow does now and then fall.

Turning eastward or northward it quite pained the eye to look out

on a country so barren and so parched, the people call it the burnt soil, and say nothing will grow on it even if they had water to irrigate it. It is not salt, excepting in places of no great extent, where a salt river enters it; but it is a barren, bare, burnt-up plain, about 3000 feet above sea-level, with many rocky ranges of hills rising about 1000 to 1200 feet above the plain. They said that if any of the inhabitants in the summer months wandered a few miles out into the Lut, they almost invariably perished. Naiband is a sort of oasis, miserable place as it is, rendering the journey from Birjand to Kárman possible in the summer. The direct road from Kárman, viâ Khabis, on which there is no water for 150 miles, is quite impassable in the summer months. From the Naiband hill I was able to see the Murghab peak, and also one other point mentioned by Khanikoff.

The Naiband hill, which is shown on a few maps, is very incorrectly placed, being more than 150 miles from its proper position, and could only have been put in from report. The people of the village had never seen a European, and crowded round me to see what a European was like. While I was at Naiband a large caravan of camels arrived from Kuh Banan, in the Kárman district. I was much interested in hearing of Kuh Banan, as it is one of the places mentioned by Marco Polo, as on his route. Kuh Banan is described as a group of villages about 26 miles from the town of Rawar, in the Kárman district. I cannot help thinking the road travelled by Marco Polo from Kárman to Kain is the one by Naiband. Marco Polo speaks of Tun-o-Cain, which Colonel Yule has pointed out, undoubtedly means Tun and Kain. At present Tun does not belong to the Kain district, but to the Tabbas district, and is always spoken of as Tun-o-Tabbas; and if it belonged, as I believe it formerly did, to the Kain district, it would be spoken of as Tun-o-Kain, exactly as Marco Polo does. Through Naiband is the shortest and best road to either Tun or Kain. Finding that south of Naiband the country, though of a desert character, was not really desert, but had halting-places with wells of water at regular intervals, and at many places inhabited villages, I thought it would be useless going further towards Kárman, as I had obtained all the information I wanted about the actual desert. I therefore stayed three days at Naiband to rest my animals, and then I hurried back across the desert to Birjand, where I was seriously ill for about ten days in consequence of the very great heat and bad water.

I then visited the Persian frontier opposite Lash-Jowain and travelled over a large extent of the border country, visiting Duruh, Tabbas, Gazik, and Yazdun. I was much interested in trying to discover into what the drainage of all the rivers and streams that run eastward falls. Near the Persian fort of Yazdun my difficulty was solved. Between Yazdun and the Persian village of Charaks I crossed a deep depression full of very salt water; it was about seven miles wide and I believe

about 26 miles long. Into this depression, which is called Dak-i-Khurshab, all streams in the neighbourhood drained. This would in any country less arid than Persia have been a very fine and permanent lake, but here it is only a lake in winter, and in the fierce heats of summer dries up again. We crossed it a few miles from its northern end, and found that it was then drying up, but the next day when we tried to cross it again, some rain having fallen in the neighbouring hills, the water rose and we were unable to cross so low down as we had done the previous day. There are several of these daks along the Persian frontier from Sistan up to the neighourhood of the Hari Rud. I know of another in the Dasht-i-na-umid, or Plain of Despair, and the great swamp of Sistan itself is, I fancy, only a very large specimen of these daks.

I got back to my headquarters at Khaf at the end of July, having been about four months away, and soon afterwards returned to England. Shortly after my return I was ordered to proceed again to the Perso-Afghan frontier. I then accompanied the Shah of Persia on his journey along the newly demarcated frontier between Persia and Russia on the northern border of Khorasan, and when I left his camp I proceeded to the village of Mohsinabad, about 80 miles from Herat. Here I lived for some nine months and made a long excursion in 1883 across the Hari Rud into Badghis, as the country between the Hari Rud and the Murghab river is called. You have heard all about Badghis from Sir Peter Lumsden, who read an able paper on it in June last, so I will not say anything of that journey except that it was a very exciting one, as I was travelling with an escort of only ten Persian horsemen, and when I did this journey the Turkoman raiding parties were in full swing, and I on one occasion very narrowly escaped falling into their hands. I came upon their tracks and so was warned in time and avoided them.

On several occasions during my residence at Mohsinabad, I accompanied parties of Persian cavalry in pursuit of Turkoman raiders, and during my stay in that village from September 1883 to May 1884, some thirty persons were carried off into slavery by the Turkomans from that part of the country, a few from the village of Mohsinabad itself.

The utter contempt with which the Turkomans treated the Persian cavalry that pursued them was remarkable. I do not consider the Turkomans a brave race. They seldom made raids on villages inhabited by Afghans, and a small body of Afghan cavalry was always ready to meet a superior force of Turkomans. There is a very marked difference in the feeling of dread which is shown by the Persian borderers of the Turkomans and the sort of half-contemptuous feeling with which they are spoken of as brigands and robbers by the Afghans, but not with fear. The Turkoman raids made on villages in Afghanistan were much less frequent than those made on villages in Persian territory, and very

little booty was carried off by the Turkomans on the Afghan side of the border. A few villages, inhabited chiefly by people of Persian race, just within the Afghan border, such as Kuhsan and Shabash, were liable to attack, but this was accounted for by the Turkomans having discovered that no great resistance would be met with from the Persian inhabitants of these villages. It is curious that the Turkomans, though such good riders and given to riding their horses such long distances, generally, if serious fighting is likely to take place, prefer to fight on foot. In almost all the encounters that I have heard of between Persians and Turkomans, the latter have dismounted or had infantry accompanying them who did the real fighting. A Jamshedi officer in the Persian service said to me, "We can always fight the Turkomans as long as they remain on their horses, but their way of fighting is, to keep a certain number of cavalry skirmishing, who retire and draw us on to a body of infantry hidden in some depression of the ground, who pour a volley into us and empty many saddles; and that is what we cannot stand." Turkomans may therefore be rather considered as mounted infantry than as cavalry.

One day, during my stay at Mohsinabad, a considerable party of travellers were carried off by the Turkomans from the Herat road, not far from that village. The news soon reached a post of Persian cavalry, who went in hot pursuit. The Turkomans, with their prisoners, managed to cross the Hari Rud river, which was in high flood. They tied dry branches of trees together, buoyed them up with a few inflated goat-skins, placed their prisoners in this sort of breakwater, and partly by swimming and partly by wading got them over. The Persian cavalry came up and might easily have caught them up and recovered the prisoners, but they would not face the roaring flood of the river and contented themselves with picking up two or three camels and some articles left on the bank by the Turkomans; amongst these was a lady's back hair and a lady's slipper, showing that there was a female amongst the captives.

Last May I was with Sir Peter Lumsden in his camp at Tirpul, in Afghanistan, as Assistant-Commissioner Afghan Boundary Commission, and I was sent by him with two Engineer officers—Major Holdich and Captain Peacocke—to Herat. None of the members of the Commission had at that time visited Herat, nor had any Englishman been inside the town for several years. The last, or almost the last, Englishman who had been there was Sir Lewis Pelly, who had visited it in 1860.

The first day we marched to the village of Rozanak. The next day to the large and flourishing village of Shikeban. The whole country was cultivated like a garden. The inhabitants of this village are chiefly of a tribe called Mervis, they are descendants of a portion of the inhabitants of Merv, who, when that town was taken by Amir-Maasum of Bokhara about 1784, fled to Afghanistan and were given lands at this place

The following day our party marched to the village of Sahar Kiz, and on the 7th May we reached Herat and encamped in a beautiful garden belonging to the Amir full of large yellow rose bushes and fruit-trees of all sorts. We remained a few days encamped in this beautiful garden, and made excursions in all directions to see the sights of the surrounding country. Amongst the places worthy of note that we visited was the holy shrine of Gazer Gah. Gazer Gah contains the tomb of a Mahommedan saint named Abdul Ansari. This shrine was built by Shah Rukh, the son of Amir Timur. A fine tomb has here been erected over the remains of Amir Dost Mahomed Khan, the first Amir of the present reigning family of Afghanistan, who died at Herat very soon after he captured that town, which fell into his hands on the 26th May, 1863. The custodian of the shrine is one of the most influential of the priesthood of the country. We were received with all honour and conducted over the shrine, and were given tea by the chief priest.

Another excursion we made was to the Masulla, or Great Mosque, just outside the town of Herat. The faïence that covers the walls is very beautiful, and such enamelled tiles cannot now be made, the art having been lost in Persia and the East.

After a few days' stay in the beautiful garden we moved into the town itself and took up our quarters in the new palace which has been built for the Amir in case he should visit the place. I was much struck by the dress of a portion of the Afghan troops. They were dressed in a close imitation of our own Highland regiments, the tartan worn by them being the Mackenzie tartan. The effect of the kilt was, however, decidedly spoilt by the men wearing white trousers in addition to their kilts. Instead of the Highland bonnet they wore brown felt forage caps with large black peaks. After a most sumptuous breakfast which was provided by the Governor, whose guests we were all the time we remained at Herat, we rode out to see the town.

The town of Herat is built on a high mound situated in a most fertile plain. The mound, which is about a mile square, is raised much above the level of the surrounding country, probably some 60 feet. It is evidently artificial, and is in great part formed of the débris of former cities. The present town is believed to be the seventh town occupying the same site. The surface of the ground immediately outside the town and beyond the great ditch is considerably lower than the surrounding country. The earth over a large surface had evidently been excavated for the purpose of building the fortifications, and also in part for raising the artificial mound on which the town is built. It is nearly square, but is rather more from east to west than from north to south, each side of the town being a little less than a mile. The town is divided into four quarters by two long central streets, the chief one running from the arx or citadel to the Kandahar gate; the other from the Kushk gate

to the Irak gate. The course of these streets, which are about 16 feet wide, is filled up with shops, and these form the four great bazaars of Herat. The point of intersection of these roads is called the Chahar Su or Four Streets, and this point of intersection is the place of chief trade, the best shops being situated in its neighbourhood. The main bazaars were in good order, and the shops mostly occupied and open. The show of goods was, however, inferior to that to be seen in Mash-had or any important Persian town. The population of the town of Herat is largely of the Persian race and of the Shiah Mahommedan form of faith. The number of people of true Afghan race is not considerable. The Chahar Aimak tribes, who form so large a proportion of the population of the Herat district, are also represented in the town. These are Sunni Mahommedan by faith, though non-Afghan by race.

There is a great deal of confusion about the Chahar Aimak tribes; Chahar Aimak means four nomads. Aimak is used in Herat simply to denote a nomad. The tribes now belonging to the Chahar Aimak are Timuri, Jamshedi, Firuzkuhi, Taemuni, Hazara, and Kipchak. The Timuri have their headquarters at Khaf in Persia, but many remain in Afghanistan, especially about Sabzawar. The Timuri, though even now a numerous tribe, were formerly much more powerful and lived in Badghis. They claim to be descended from Arabs, and are called Timuris, because their original chief married a daughter of the Amir Timur. They are, however, called Juts by their enemies, though they resent being so-called. They very much resemble in appearance the Juts of the Panjab, and I should fancy are descendants of the ancient Getæ.

The Jamshedis now dwell in Badghis, especially about the Kushk stream. They claim originally to have come from Sistan, and thus are a Persian race.

The Firuzkuhi are also a powerful tribe, who claim to have been brought from the Firuz Kuh mountains to the northward of Tehran in Persia.

The Hazara tribe included in the Chahar Aimak are chiefly settled about Kala Nau, in Afghanistan, and about Mohsinabad in Persia. The Hazaras say they originally came from Kittai or Western China. Their Tartar faces and crookedly set eyes, and want of beard, show them to be of Turanian race; but it is curious that all these tribes speak neither Turki, Mongol, nor any other Tartar dialect, nor do they speak even Afghan, but Persian. These Hazaras of the Herat district are not all friendly with the mountain Hazaras, who are known to the Afghans as Berbary, and who inhabit so large a portion of the mountainous part of Afghanistan.

The Kipchaks are a small tribe settled about Obeh.

Herat in former times is said to have contained 100,000 inhabitants, but at present I do not think that besides the strong Afghan garrison

it contains more than 12,000 inhabitants, though the surrounding country is full of villages and very thickly populated. The whole of the Herat Valley from Obeh to Kuhsan, or a distance of probably 120 miles by about 12, is, I am informed, cultivated like a garden, as the 60 miles or so seen by me from Kuhsan to some miles beyond Herat certainly were. Everything grows with the greatest luxuriance, and in wonderful profusion. Wheat and barley are produced in large quantities, while fruits such as peaches, apricots, grapes of many varieties, plums of many sorts, mulberries, walnuts, and almonds, are grown in great plenty.

Pistachio nuts of a superior sort grow in abundance quite uncultivated on the downs beyond the mountain range, and on the lower slopes of the hills themselves, while the rich down country to the north of the mountains would afford pasturage for unlimited flocks of sheep.

The value of Herat to any one approaching from the north has been shown over and over again. The Herat valley is the only place in this part of Central Asia where a large body of men could be fed, and any one holding possession of Herat would have a most commanding influence in the affairs of Afghanistan and Persia.

The Russians are making their railway from the Caspian Sea viâ Askabad and Merv to Samarkand; the line, which it is hoped will be finished in three years, will not pass through Bokhara, to which it is proposed to make a branch line.

I believe nothing would insure peace and quietness in Central Asia so much as our continuing the Quetta line of railway to Herat, and this line could eventually be joined on to the Russian line.

If a string is stretched over a globe from England to India, it would nearly follow the line through Russia to Vladikafkas, at the foot of the Caucasus Mountains (where the Russian European system of railroads at present ends, but which is about to be continued to Petrofsk, on the Caspian Sea), and then would pretty nearly follow the Russian Trans-Caspian line, and thence onward through Herat to Quetta. I know there are difficulties to be contended with in the making of a line of railway to Herat, but the difficulties are not of a physical character, but chiefly consist in the prejudices of the Afghan and English peoples. I wish at all events to try and ventilate the possibility of making such a line so as to remove the prejudices of the English. I believe the difficulties which the English would have to contend with as regards the prejudices of the people through whose country it would be made, would be far less than those the Russians will have to contend with in making a railway through Bokharan territory to Samarkand.

The possibility of running railroads in Central Asia has been greatly facilitated by the finding of almost unlimited supplies of fuel, in the shape of petroleum. The whole country from the north-eastern corner of the Black Sea through the Caucasus to Baku on the Caspian Sea, is

full of petroleum, which is found at certain points, such as Baku, in almost unlimited quantities, and also in the Trans-Caspian provinces it is found in large quantities. All the steamers employed on the Caspian, which are very numerous, burn petroleum as fuel, as do also the locomotives used on the Trans-Caspian railroad. The advantage in burning petroleum over coal is that a much less quantity is required to perform the same work. For instance, a steamer would only require to use 90 tons of petroleum, where she would require to use 240 tons of coal. Thus a steamer or an engine burning petroleum could carry a supply of petroleum sufficient to keep their engines going for nearly three times the period that the same quantity of coal would last. Petroleum is sold at Baku at less than a halfpenny a pood of 36 pounds, and the supply is practically unlimited.

In the year 1881, the last year for which I have returns, the quantity of petroleum extracted from the wells in the neighbourhood of Baku was 30,000,000 poods. This was before the railway from the Caspian to the Black Sea, which is now open, was finished, and I have reason to believe that the quantity of petroleum extracted in the current year will far exceed, if it should not prove to be double the quantity, extracted in 1881. Though the crude petroleum as extracted from the soil is generally used for burning in steam engines, the *astaki*, or refuse remaining after kerosine oil has been extracted from the petroleum, is almost as useful for burning in steam engines as the actual crude petroleum itself, and is frequently used in steamers on the Caspian. Mineral wax also is found in considerable quantities in the island of Cheleken in the Caspian Sea.

In the trans-Caspian territory of Russia, near the line of railway from Michailofsk to Askabad, a boring has been made, and a large quantity of petroleum is here produced. A refinery has been established and a small branch line of railway has been laid down to connect these naphtha-springs with the main line.

The quantity of petroleum found near Novorassisk, on the Black Sea, and in the whole district of the Kouban, is very great, and being obtained near the Black Sea is much more accessible to Europe than the petroleum found near the Caspian Sea. Besides the enormous quantities of petroleum found in Russia and America, large quantities could, I believe, be procured by boring in Burmah, and petroleum has also been found in the country near Quetta. This last, if it should prove to be in considerable quantities, would be most useful in case the Indian railway lines were extended to Herat. A railway joining our Indian system of railways to the Russian system, would, I believe, be the finest guarantee of tranquillity in Central Asia. From London to Quetta on an arc of the great circle is 3165 geographical miles or 3640 English statute miles. If this line were completed the journey from London to India could easily be accomplished in eight days; there would only be two breaks,

one at the Straits of Dover, and the other between Petrofsk, on the western side of the Caspian, and Krasnovodsk on the eastern side of the same sea. This piece of sea is now crossed by the Russian steamers in eighteen hours, but they are of very small power, and travel at a low rate of speed; such steamers as carry the Irish mails could cross the Caspian in about nine or ten hours.

Copper is found in very large quantities in Eastern Persia, near the Afghan border; lead is also found there in considerable quantities. At present, in consequence of the scarcity of wood in this part of Persia, it does not pay to smelt it, but if petroleum were brought by the railway from the trans-Caspian province of Russia to the neighbourhood of Herat, these metals would probably be smelted and carried by the railway.

After the paper,

Sir Henry Rawlinson said he very much agreed with all that Colonel Stewart had stated on the subject of the fertility and importance of Herat. Colonel Stewart had dealt with the question in a very wise and cautious manner. It was an understood thing in official circles that whilst any question was actually under negotiation it was not considered decent to discuss it in public. A commission was at present employed in delimiting a line between Russia and Afghanistan, and therefore it would be very inconvenient to discuss the general political aspect of the question. It should be remembered that Herat was an independent city, belonging neither to Russia nor to England, but to Afghanistan. It was a very suitable, not to say a formidable position, when viewed as a defence and support of Afghanistan; but in the possession of either England or Russia he believed it would be what was generally called a white elephant—at any rate, in the present state of railway communication. It would be almost impossible for either Russia or England to maintain an efficient garrison there, the distance from either frontier being so great that a garrison in Herat could never be supplied with carriage, provisions, arms, munitions of war, and all the requisites of an army except at such an enormous expense as would far outweigh the political value. "Le jeu ne vaut pas la chandelle." He believed that that was the feeling actuating both countries, and that Herat would be left as a defence to Afghanistan uninterfered with by any other Power. At the same time, he quite endorsed what Colonel Stewart had said, that from its extraordinary fertility and geographical position, the Power that held Herat, whether Russia or England, or Persia, or Cabul, would exert a very strong, if not a commanding influence, on the surrounding regions of Central Asia. He trusted, however, that English efforts would be directed towards maintaining Herat for the Afghans.

Sir Frederic Goldsmid said that some twenty years ago, when he had returned through Beluchistan to India from Tehran, he had the pleasure of meeting a young officer from the Panjab, who asked him a great many questions about travelling in Persia. These questions were put in a very pertinent form and with a great deal of intelligence, and evidently the officer meant more than mere questioning. Shortly afterwards, that same officer went to Persia and made his mark there; he it is who has just read the paper before the Royal Geographical Society. What Colonel Stewart had now stated was hardly one-tenth of what he had done in the way of exploration and research—chiefly in the north-east above Khorasan, in the Turkoman country. Reference had been made to his (Sir Frederic Goldsmid's) journey into Sistan. That was only one of two expeditions he had made under Government

orders about thirteen or fourteen years ago. If he were to speak about those missions he would have to tell a very long story indeed, because he did not believe that much was known about them at the present day. He had no special correspondents in his camp: moreover, he was obliged to put a veto upon any writing for the press, and to keep that veto in mind more particularly in his own case. Consequently, very little was known about those missions. For his own part, he could not but wish they had appeared in the shape of a Blue Book, because there was an interesting correspondence between himself and the Persian Commissioner, which he thought would be found a curiosity of Oriental literature, and a very good lesson for those who studied Oriental diplomacy at the present time. He would only allude to the geographical part of his second mission. He then travelled from Karman across the Lut Desert, arriving near the Lake of Sistan about the beginning of January. It was an exceedingly cold night and, as their tents had not come up, he and his companions slept out in the open air around a brushwood fire. They made the best of their coats and wrappers, but in the morning his beard was covered with icicles: there was much frost, and the cold was greater than he had been led to expect in that quarter. He next went to Lash, then struck to the westward of Birjand, from there up to Kain (not by Colonel Stewart's route, but by a more direct route), from Kain up to Turbut Haidari, and then on to Mashad. Colonel Stewart had referred to the traditions or legends of the country, and he (Sir Frederic Goldsmid) remembers passing a place called Yunsi after the prophet Jonas, because the prophet Jonas really was thrown up there from a whale. The idea naturally was that the whole of that region had in former days been a sea. Colonel Stewart had very truly mentioned that the Amir of Kain did not treat him (Sir Frederic Goldsmid) with great civility, though he treated Colonel Stewart particularly well. He quite admitted that; but the fact was to be attributed to the circumstances of the Sistan Arbitration, when the Arbitrator had to pass judgment on the Amir's encroachments. On his going to Karman in 1866, with Major Murdoch Smith and five Persian servants, they were treated with a hospitality which he could never forget: his servants were all cross-examined by the Governor himself in order to make sure that they were men who could be trusted: every possible advice and assistance was given to him, and everything done to make the journey comfortable. When he asked the Governor what he should give him in return, or send him from Bombay, the answer he received was, "There is only one thing I wish for: when I was a boy, Sir John Malcolm took me upon his lap and was very good to me. I understand he has written a history of Persia. If you can get me a translation of that history, it will be the greatest pleasure you can bestow upon me." Through the kindness of the then Governor of Bombay, Sir Bartle Frere, he was enabled to obtain the translation, and present it to the Governor's son, the Governor having died previous to the completion of the work. If he had gone by himself to Kain, he did not believe he should have been treated worse than he was by the excellent Governor of Karman. It must not, therefore, be supposed that it was the usual habit of Persian Governors to be unfriendly to visitors. He was sorry to differ from Colonel Stewart on the railway question, but he did not like pushing the line further from Kandahar towards Herat, unless the whole country were in English hands. He would much prefer an international railway from the Herat direction down to the sea. There were ports such as Gwádur or Gwatar which might be made the outlet from Central Asia and be connected at the same time with Karàchi by railway along the Makran coast.

Mr. BLANFORD said that no doubt small quantities of petroleum had been found in a great many parts of the Indian Empire, and probably in various other places in Central Asia, but in the majority of cases it had not been sufficient to afford any large supply. Of course he was not referring to such places as the neighbourhood

of Baku. It had also been found in Burmah and Assam as well as in two or three localities in the Punjab. Some years ago gasworks were started at Rawal Pindi with the hope that sufficient petroleum would be found in the neighbourhood to supply the gas, but the result was not very satisfactory. The place near Quetta to which Colonel Stewart had alluded, was doubtless one in the Marri hills. It had not yet been properly explored. He had intended to go there himself, but unfortunately had not time to do so. All that was known about it was that a certain quantity of petroleum did exist there, and was used by the people chiefly as a medicine or ointment for their cattle, but whether the yield would prove to be large was very doubtful. Judging from other instances in that part of the world in which the occurrence of petroleum had been reported, he did not think it would be wise to attach much importance to it. Some time ago it was believed that coal would be found on a part of the route along which the railway was being made to Quetta, but he feared that in that case also the quantity was but small. There was one peculiarity about the whole of the plains of Central Asia which they shared with many of the plains in the central portion of North America, namely, that they had no outlet, and that the small streams, which usually only ran for a very short distance, were quite insufficient to do more than to supply the rapid evaporation, and as many of the plains had the appearance of having been formerly lakes, it had occurred to several persons that such was really the case, and that by the gradual decrease of the rainfall they had been dried up; but Baron von Richthofen, who examined several similar plains in the north of China, where he had better opportunities of noticing their structure in consequence of their being traversed by streams, found a remarkable resemblance between the deposits in them and the deposit which occurred in the valley of the Rhine known as loess, and suggested that they were not formed by the deposition of water, but of the fine dust which was carried about by the winds. The form of these great plains without an outlet was of course caused by certain geological changes which had taken place, in all probability at no very distant epoch, but the filling up of the centres of the plains so as to convert them into sheets of fine deposit was very probably due to the winds carrying the dust formed by the disintegration of the rocks in the surrounding country. The small quantity of water that reached the plain always contained some salt, and when the water dried up, the salt remained to form the pans that were so very frequently met with.

Brigade-Surgeon Aitchison (Naturalist to the Afghan Delimitation Commission), read to the meeting the following account of the botany of the region:—The valley of the Hari-rúd, taking Herat as its centre, of which Colonel Stewart has just given such an interesting account, is extremely fertile, this being dependent upon an easy access to water, of which there is an unlimited supply, as well as to the richness of the soil. The cultivated area produces magnificent crops of wheat, barley, cotton, grapes, melons, and the mulberry tree, the last yielding food for the silkworm. At this elevation these crops all require careful irrigation; but at higher altitudes, viz. above 4000 feet, and in certain localities, good wheat and barley are grown without irrigation. In the valley itself the extent of the cultivated area is only limited by the amount of labour procurable. The cotton produced is, comparatively speaking, poor, and silk culture has of late years greatly fallen off, owing to sickness amongst the worms—indeed, in many of the villages they are now no longer reared. Surrounding the villages, and in orchards, we find the following trees cultivated, some held sacred, as *Pinus halepensis* and an ash, others for their timber, as two species of elm, or for their fruit, as the apricot, apple, plum, quince, peach, pomegranate, *elæagnus*, and *zizyphus*. In one or two favourable localities, at 6000 to 8000 feet, *Pinus halepensis*, although originally cultivated, has become almost naturalised.

On the islands of the river and its low banks the Euphratic poplar occurs as a fine tree, forming forests, which are greatly resorted to for fuel.

The general appearance of the country during winter is barren and arid in the extreme, owing to the absence of trees and woody shrubs; these, where they do exist, are localised. The great and sudden alteration that takes place in the appearance of the country upon the advent of spring and summer is scarcely to be credited, the mass of the vegetation consisting of perennials that throw up their annual foliage from great underground root-stocks, bulbs, tubers, and rhizomes. By the middle of May prairies of foliage have suddenly appeared over a country that in March looked incapable of producing anything. The shrubs that attracted my attention most from early spring were the several species of large Umbelliferæ so truly distinct from anything of the sort that I have heretofore seen. Each of these species was more or less localised, yet all spread like extensive miniature forests over the great plains and plateaus; these, when in blossom, gave a grand colouring to the landscape, from shades of pale lemon to autumnal russet, depending on their stages of growth. The most prominent and remarkable of these was the assafœtida plant (*Ferula scorodosma*), which, when it begins to throw up its flowering stem, at first presents the appearance of a large cabbage; another, the plant that yields a galbanum (*Ferula galbaniflua*); the amoniacum plant (*Dorema* sp.), a *Ferula* of which the stipules form large cups round the main stem; and, lastly, one so tall that it is called the Horse Ferula, owing to its being much taller than a man on horseback. This has such a large stem that it actually assists to form a jungle, along with the usual tamarisk met with in these regions. In special localities, and where the sandstone rocks are exposed and come to the surface, forests of a pistachio, which I believe to be *Pistachio vera* in its natural wild state, are much met with. The districts yielding these forests are called by the natives *pistalik*. In their leafless winter condition, as I first saw them, owing to the peculiar grey colouring of the bark, these trees give a character to the country as if one were looking at the rocks and background through a haze or smoke. They are of no great height, from 12 to 18 feet, with poor timber, but excellent material for fuel. In summer they are covered with a deep green dense leathery foliage that gives good shade; from the tree is collected, in due season, the pistachio nuts that are so largely exported to India from Afghanistan, as well as a gall that is developed on the leaves, for tanning and other similar processes.

Close to the Do Shakh peaks, on the limestone cliffs, and chiefly the southern exposure, *Pistachio mutica* exists as a good-sized tree; its leaves are collected to be employed in dyeing processes, but the galls of this species, which are of a different form from those of *Pistachio vera*, are not used. In this locality, on the northern exposure of these hills, in the dry stream beds, I collected a species of *Cercis*, the wands of which, in the neighbourhood of Mashad, are largely employed in basket work. From above 5000 feet on the hill ranges the common Afghan and Himalayan tree juniper, viz. *excelsa*, exists in more or less dense forests, and this is the only true conifer in a wild state that I came across.

In the rocky regions and interior of the hills, where moisture is present, at and over 5000 feet, a *cotoneaster* is common; this in certain localities yields the manna-like product called *sher-khist*, which is collected in the heat of summer; but it only occurs every second or third year. It is pleasanter to eat than the other two mannas collected near this, viz. that from a thorny pea shrub, *Alhagi*, called *taranjabin*, and from a tamarisk called *gaz-anjabin*. The other trees that I met with were a hawthorn, an *elæagnus*, a maple, and two or three species of *Prunus*. The earliest spring flowers are three species of *merendera* or allied genera. These are closely followed by a fine bright-coloured tulip, varying from light pink

through every shade of red, red and yellow, to pure yellow; later in the season several *eremuri*, a Liliaceous genus, are spread over the great slopes of the rolling hills, which, when in full blossom, give a grandeur in colouring only to be eclipsed by the wealth of the golden flowers of a *delphinium*, that are collected for dyeing silk yellow, and which, as a trade article, is exported through Persia, Turkistan, and even south as far as Umritsir. The roots of one or probably several of these eremuri are largely employed to manufacture vessels for holding oil. The roots are dried, powdered, and then boiled in water, yielding a gummy mass which is painted on to a mould. When dry, the mould is broken up and removed.

Those I have mentioned are the more interesting plants; but the ordinary everyday types are two low artemisias, two species of *ephedra*, a small yellow rose, and numerous *astragali*, which with grasses form the most of the herbage of the country. An *astragalus* that may prove to be *A. veri* yields largely a gum—the gum tragacanth of commerce—collected and exported to Mashad and Turkistan, to be employed in stiffening fabrics.

The last and to me the most interesting plant that I would wish to bring to your notice here, is a species of asclepiad that grows in the beds of streams at 4000 feet on the eastern side of the Paropamisus Range, at and in the vicinity of Gulran. It was winter when I first came across this shrub, growing out of a swampy stream bed; it consists of an underground creeping root-stock, that throws up annual stems; these flower, fruit, and die, but remain attached to the parent stock for several years, so that clumps of shoots of several years in different stages of disintegration are seen to remain still united to the parent stock. On looking at the bases of these stems, I found quantities of fibre, naturally accumulated, rubbed off from the stems by friction against each other. The Turkomans told me that this was made into cloth, and the fibre is an excellent material for such purpose. The bark of the root is well known to the nomad tribes, being employed by them in tanning their water-skins. I believe this to be the same plant as that similarly employed near Lob-nor, in Eastern Turkistan. Living roots of it I was able to send to the gardens at Seharanpore, where they arrived alive, and were in good growing condition when I last heard from Mr. Duthie. I regret to say that I was unable subsequently to collect herbaceous species during the summer.

Sir George Campbell, M.P., said he had paid a good deal of attention to all that had been written on the subject, but he had never quite realised the actual extent of the Herat Valley proper, its population, and its cultivation. Colonel Stewart said it was about 100 miles long, by about 12 miles broad; but he understood that the cultivation was by artificial irrigation, and that perhaps involved a good many breaks in cultivation. He desired to know whether the population was to be reckoned by tens of thousands, by hundreds of thousands, or by millions, or what was the approximate land revenue derived from it by the Amir.

Colonel C. E. Stewart, in answer, said there were, of course, broken spaces where there was no cultivation, but he should say, speaking roughly, that the valley was about 120 miles long, and that from four to six, or even seven miles on each side of the river was irrigated and cultivated, with occasional patches that were not cultivated. If the population was large enough, the cultivation could be very widely extended, all that was required being labour to make new canals. He could not, off-hand, furnish information as to the number of the population, but he had notes on the subject, which he would communicate to Sir George Campbell privately.

General Sir F. P. Haines said that Colonel Stewart's remarks about the shortest line from England to Quetta would give considerable matter for thought to

strategists, and there was no doubt that the interest taken in the geography of the region described in the paper arose from its strategical aspect. It was really a somewhat serious matter that Baku, Krasnovodsk, and Askabad were precisely the points on our shortest line of communication with India, especially when it was remembered that Russia was striving her utmost to improve her communications by that route, so as to enable her to put the screw on England at any moment she might desire to do so. Seeing the thing very plainly in his own mind, he had never been in the least degree alarmed as to what was being done by Russia so long as England was awake to it. He thought it would be quite sufficient for England to make her railway safe to Kandahar without going on at present to meet the great strategical line which Russia was forming. He wished to ask Colonel Stewart if the petroleum was capable of being used for smelting ore? and to ask Dr. Aitchison if he had met with any ferns in the districts he had explored.

Col. C. E. Stewart replied that he had seen petroleum used for working steam engines and steam hammers, and for making gas, but as yet it had not been applied to smelting purposes in Central Asia.

Dr. Aitchison said he only met with one species of fern, and that in very small quantities; it was a species of *Adiantum*.

The President, in concluding the proceedings, said they had had a singularly attractive paper upon a region part of which had not much natural attraction. These border regions were until recently so little known, that he believed the Persians themselves hardly knew where their own frontier lay. He had heard of a traveller who, wishing to go north from Tehran, asked the British Minister there where he should find himself over the Persian frontier and in the Turkoman country, and was told to go to the Persian Minister of Foreign Affairs in order to obtain the information. He went, and by the Persian Minister was referred back again to the British Embassy, it being perfectly unknown at Tehran where the frontier was. Almost all the information obtainable about the region was derived from gentlemen who had been brave and courageous enough to risk their lives, and very often their freedom, in such explorations. He would not allude to politics; still he could not but express a hope that the stores of petroleum would do something to oil the wheels of diplomacy. The country seemed somewhat analogous to the great plains of North-West Canada, where large streams and lakes had dried up, and where, so far as Athabasca was concerned, there were vast stores of petroleum. Every one must hope that the country described by Colonel Stewart, which was once highly civilised, might again become the home of a numerous and happy people.

Arctic Exploration, with reference to Grinnell Land.

Address by Major A. W. Greely (United States Army).

Delivered at a Special Evening Meeting, December 21st, 1885.

It must be with a certain degree of hesitation that a gentleman addresses an audience as large and distinguished as this, knowing that he has made no especial preparation for a meeting which does him so much honour. Time and my health would have failed me if I had attempted to do this, and so I come to speak extemporaneously. If in so doing my remarks may not be as coherent or as well-connected as

they might be, or if I do not proportion my time and space as well as I should, I am sure that you will be indulgent. So too, separated as I am by thousands of miles from my notes and papers, if in speaking of facts there should be some slip of memory such as happens to every man who has led an eventful life, I am sure that you will consider that I refer to them as I believe them to be now.

I speak to-night of Grinnell Land. The map on the screen behind me is not a very large one. Grinnell Land is this bit shown within the Arctic Circle. To the south-westward of Smith Sound is Ellesmere Land, which can scarcely be considered a part of Grinnell Land. As you can see, the land resembles very much a rather badly shaped figure 8. This land has been known to us but some thirty years. Our knowledge of it grew out of a voyage made not for discovery, but in the interests of humanity—the summer search of Admiral, then Captain, Inglefield for Sir John Franklin. It fell to his fortune in that search to go farther north in Smith Sound than had Baffin two centuries before, or had Ross some fifty years previous. The outcome of his discoveries was to prove to us that Smith Sound, instead of being a closed bay, was a strait opening to the northward into that large circular space, which is known to-day as Kane Sea. The results of Captain Inglefield's observations were not sufficiently marked to enable him to tell us that Grinnell Land existed. His charted observations indicated Ellesmere Land as extending to the northward,—as being a continuous land on the west side of those waters. It must be remembered that he was there but a few hours, and that he did not pass beyond Cape Sabine, and so was unable to observe the strait or bay (Hayes Sound) which separates Ellesmere Land from Grinnell Land.

As Inglefield's discoveries told us that Smith Sound opened to the northward, so Kane, who followed Inglefield in his mission of humanity—in his memorable search for Franklin. The result of Kane's labours was to extend Smith Sound or Kane Sea still further northward through Kennedy Channel. It was the fortune of Morton, a mate of Kane's, to look northward from Cape Constitution on what he then believed to be the open Polar Sea. Of course in these days we know the error into which Kane and Morton fell in believing that that was a portion of the Polar Sea, for in reality it was but the southern end of Kennedy Channel. It none the less is true that the report brought back by Morton was a faithful and correct one. He saw several hundred square miles of open water, and as he was not able to ascend Cape Constitution and to see that Greenland still extended to the northward, he was in a manner justified in reporting that there was a sea to the northward. Dr. Hayes, Kane's surgeon, was the first civilised man ever to place foot on that land which we now know as Grinnell Land. That was in 1854, thirty-one years ago. Hayes traced the land a certain distance northward, and six or seven years later, venturing forth in command of an

ill-provided expedition, succeeded in carrying the shores of Grinnell Land still further northward, reaching, as he claimed, Cape Lieber, 81° 32′ N., from which, as he said, he looked out on the open Polar Sea. But if Hayes thought that he saw the Polar Sea, we know now that he did not. He looked out on another of those openings to the northward of Kennedy Channel, which is known as Hall's Basin.

Ten years later, after the conclusion of the great civil war had left "the republic beyond the sea" free to engage in other work, Hall sailed north, in the first purely adventurous exploring Arctic expedition that ever started from the United States, on an attempt to reach the North Pole. Hall's fortune was good at first. He succeeded in carrying his vessel to a latitude unparalleled in those days; and about the 1st of September, 1871, he sailed viâ the West Greenland Channel into the Arctic Ocean, the first vessel that ever had ventured in those waters. He reached the latitude of 82° 11′ N., but owing to doubt among his party as to what the proper course was to pursue, he subsequently retreated to winter quarters in 81° 35′ at Thank God Harbour, where a few weeks later he died. The result of Hall's expedition was to carry Grinnell Land still farther to the northward, to very near the 83rd parallel, and as some map-makers, who took up his work after his death, thought, to carry it up to the 84th or 85th parallel.

After that came the British expedition of 1875–6, an expedition which succeeded in clearly outlining and defining and accurately locating the shores of that land, which had been laid down but poorly and inaccurately by previous explorers. To them we owe the accurate outlines of Grinnell Land which we know of to-day. The *Alert* succeeded in pushing perhaps 10 or 12 miles farther northward into the Arctic Ocean than had the *Polaris*. The former vessel wintered at Floeberg Beach, in 83° 27′, looking out towards the Polar Sea. From that ship was sent out another expedition under Captain Markham, which attained in that year the honours of the farthest north for England, or rather retained it for her, as all the farthest norths to that time had been made by Englishmen. It also sent out a second party which extended Greenland very nearly northward to the 83rd parallel, under Captain Beaumont; and a third expedition to the westward, which succeeded in outlining Grinnell Land to Cape Alfred Ernest, the most north-west point on that coast ever reached by any man. In addition to these explorations, Lieutenant Archer succeeded in penetrating south-west into what was supposed to be Lady Franklin Strait, and to separate Grinnell Land from Grant Land. Archer determined it to be a fiord, and it now bears his name. No officer of that expedition, however, succeeded in penetrating any distance into the interior of Grinnell Land, or lifting the veil of mystery which covered, till a few years since, the interior of that remarkable land. Major Feilden penetrated 20 miles inland from the shores of the Polar Sea near Floeberg Beach. Lieutenant Archer went

five or six miles inland from near the head of Archer's Fiord; and I think, but I am not certain, that it was Lieutenants Archer and Conybeare who penetrated 10 or 12 miles inland into another valley, the Bellows. Lieutenant Aldrich said of his voyage along the shores of the Polar Sea, that he was never able to see over eight or 10 miles inland; so that while he accurately outlined the northern coast, he gave us no knowledge of the physical configuration of the land.

I sailed northward in 1881, in command of one of the scientific expeditions which was organised under the idea brought forward by Lieutenant Weyprecht, and in accordance with the suggestions of the International Polar Congress. The work of my expedition was purely scientific: at least, so I read the orders; but I could scarcely have been a man, or an American at least, if, going northward for scientific purposes, I had not done my best to extend our knowledge of the geography of the Arctic regions. And so sending northward a party under Lieutenant Lockwood, it was his good fortune, on one pleasant day in May, to reach the most northerly land known on the earth, Lockwood Island, 83° 24′ N., 396 miles from the geographical pole. In addition to that extraordinary trip, which it does not fall within my province to speak of particularly to-night, I sent a second party northward to travel over the rough Polar ocean, in order to beat the latitude of Markham. As so frequently happens in this world, work which was intended to catch the eye of the world, and to bring in a glittering reputation, failed; but the good, honest and proper work I did in sending Lockwood northward, not only succeeded, but resulted in that thing which I had hoped for from the special journey that had failed. I speak of this as an instance of how that thing which we value the highest sometimes comes to us in an uncertain and unexpected way.

While my officers were at work doing this exploring northward, my attention was naturally taken up in seeing that they were properly supplied, that the depots were well filled, that everything was done to ensure their safety and success; but when that was done, the tedium of an Arctic station was so great that I felt I too must do my part of the work. Although dogs failed me, as all had been put in the field with the other parties, I turned inland with three other men and we succeeded in making on foot perhaps one of the most remarkable inland voyages of Arctic exploration, a trip of 250 miles in twelve days, by which the peculiar configurations of Grinnell Land were made known to us. It showed to me a large river emptying into an extensive fiord, Chandler Fiord, which had been passed by Captain Stephenson and Lieutenant Archer, as being a small bay. This fiord, opening out to the westward of the point seen by Stephenson and Archer, led me up to Ruggles river; and as I followed it, I eventually came to its source, finding there, at the end of an Arctic winter of unparalleled severity, its head open, and the river itself fed by a glacial lake of 300 square miles,

(Lake Hazen) and situated at an elevation of 500 feet above the sea. Later in that year, during the summer time, I was able to make a second voyage into that country, travelling with dogs, and taking with us a two-wheeled conveyance for a certain time. Our trip covered 350 to 400 miles, it being quite impossible to tell with any absolute degree of accuracy how far you travel in an Arctic country. Your path is such a very winding one, the way is so rough, that you have great doubt and uncertainty as to how far you have gone, and are very prone to over-estimate the distance. Perhaps I have over-estimated mine. I think I travelled about 400 miles, but I am quite certain I travelled 350 miles. The result of that was to disclose a very remarkable condition of affairs in that country. I have no doubt most of this assemblage picture everything in the Arctic circle as necessarily indicating a desolate and forbidden region, and imagine that there is naught there but rocks, ice, and snow. That idea is correct in regard to a good portion of it, in regard to Greenland particularly; but in Grinnell Land I found something different. I found there, extending along this glacial lake, a large number of valleys which trending to the westward, eventually led me to the summit of a mountain (Mount C. A. Arthur) from which the whole of Grinnell Land lay stretched out before me as on a map. My attention was naturally turned to the northward, and there I saw the mountain ranges trending to the north-west, which led me to believe with a certain degree of probability that the land I saw connected very closely with the land seen by Lieutenant Aldrich, and that the Western Ocean was not far distant; but there was another point to the northward, 40 or 50 miles, where I saw an ice-cap which covered the whole north of Grinnell Land—an immense covering of ice probably 200 or 300 feet thick. This ice bursts to the southward through every break in the United States' Mountains, feeding the large glacial lake. I visited one bit of ice, Henrietta Nasmith glacier, five miles broad, and from 150 to 200 feet high. In the valleys which I have mentioned game abounded in very considerable quantities. During our two years' life in Grinnell Land we killed over 100 musk oxen, a kind of cattle that are a sort of cross between the ox and the sheep. I also saw some 200 more, and I have no doubt that to-day there are not far from 300 head of musk oxen roaming about the fertile valleys of Grinnell Land, living on the abundant grass, saxifrage, and willows which cover the inland valleys.

Although this region appears desolate in winter when it is nearly covered with snow—but not entirely covered—yet in summer, to one accustomed to a very high latitude, it presents scenes of remarkable beauty. The mosses of the Arctic regions have a colour and luxuriance which is never to be seen in temperate climes. The browns, the yellows, the reds, and the greens, are so mingled and blended as to give the landscape a colour of great beauty. In the interior of that country I

have seen moss beds acres in extent, and a creeping Arctic willow which rises scarce an inch above the soil, covering the ground for many acres so closely that the foot of man could not touch it. In other places there are large beds of purple saxifrage, the hardiest of all Arctic plants, or of dryas, another luxuriant, rosaceous plant with a little white flower growing in clusters. Smaller beds of those two plants were frequently seen. During the summer-time the scenery is not entirely devoid of animal life, apart from the musk oxen, and the ptarmigan, which remain there the year round. It goes without saying that the Arctic wolf, the fox, the hare, the lemming, and the ermine remain there the year round. Those are seen in early spring, throughout the summer, and in the early autumn. In addition there comes a large number, some thirty or more, of birds, which pass the 81st parallel. Among them is a tiny bird, perhaps not unknown to you in England, the snow bunting, which is seen as far north as the foot of man has trodden. Besides that are the waders, ducks of several kinds, the beautiful eider duck, the female bird of which is remarkable for its beauty of colour. I think it has one of the finest and most beautiful coats I have ever seen. Then there is the king duck, of gorgeous colours. His head looks very much like a rainbow at times. There are also the long-tailed duck and other birds, generally waders, and the gulls. These are with us for six or seven weeks, during which time the snow melts rapidly, and the waters run freely into the surrounding inlets, affording plenty of feeding ground for these birds; so that along these shores the Arctic summer is not quite as dreary as many people think it is.

But to speak more fully of Grinnell Land, I will say that the following year, 1883, Lieut. Lockwood, passing down Archer's Fiord to the head, succeeded in crossing Grinnell Land to the western Polar Sea, reaching a salt-water inlet which he named Greely Fiord, and found a southern ice-cap, perhaps the most remarkable in the world. For 70 or 90 miles he travelled with Sergeant Brainard and an Eskimo across this country, passing frequently under the shadow, and at all times within sight of this remarkable ice-cap, which had an average perpendicular height of 150 feet. That gives you some idea of the character of the ice of those lands, formed from the snowfall, which is not large. So that we found in Grinnell Land these two great ice-caps covering the northern and southern parts, and between them these fertile valleys. The question as to why these ice-caps remain there is easily settled. Many of you are familiar with the fact that Nordenskiöld has twice visited Greenland, in the hope of penetrating its interior and finding there the fertile valleys which were said by the Eskimo to be the pasture ground of the reindeer. He succeeded in travelling long distances inland, but he discovered that the ice still rose—that the inland cap covers the whole of Southern Greenland. The unexpected orographical features of Greenland, he says, were the cause of this, that is to say, that this ice had formed on a land

substantially level, very much like an inverted saucer. The same conditions exist in Grinnell Land, where to the northward and southward are plateaus substantially level. Between these two is a series of narrow valleys, which by their slanting sides afford the largest amount of surface for the heating rays of the constant summer sun. In those valleys too, the snowfall is not of very great amount, probably not over a foot during the winter. The result is that as soon as the sun has power, late in May or early in June, the snow melts very rapidly in those valleys, which are narrow and have a sharp gradient, and the waters are soon discharged into glacial lakes, and thence into the fiords. That accounts for the freedom of this part of Grinnell Land from ice and snow. I think in regard to that snow-free land, however, it is very possible that these glaciers never did unite within its limits, but rather that both ice-caps at one time discharged for their whole extent of front into the sea.

The strip of country from Robeson Channel for 150 miles westward to the Polar Sea is of comparatively low elevation. I suppose the greater part is not more than 600 or 700 feet above the level of the sea. A narrow ridge shoots upward, the highest point of which, as I remember, is about 2300 feet above the sea. I have no doubt that Grinnell Land within modern or recent ages has risen from the sea. At the height of 1000 feet I think Major Feilden found shells the same as those now in the Arctic Sea. My own party found shells 1500 to 2000 feet above the sea similar to those of adjacent living shell-fish of to-day; so that we know that at one time these cliffs and terraces must have been under the Arctic Ocean, and at that time I have no doubt that these ice-caps to the northward and southward discharged into this strait, which at one time ran across Grinnell Land without any manner of doubt. But as the land rose these ice-caps with their perpendicular front were left with the valley in between. I found near one of the lakes, about seven or eight miles from the sea-shore, two trees embedded in the bank, which were in such a state of preservation that I was able to use a considerable part of them for fuel. There is no doubt the trees drifted there, and their elevation has been so recent that the wood was not spoiled, though it goes without saying that anything exposed to the Arctic air will maintain itself in a state fit for use much longer than in any other part of the world. This, I think, gives you a good general idea of Grinnell Land.

Now in connection with Grinnell Land and the ocean to the northward comes the question of ice—the question that has interested a good many people, and about which a great deal has been said. With respect to that, what I say here to-night is merely my own opinion, the opinion put forth by a man who has devoted no special study or care to anything of this kind before he went north, but the opinion of a man who has used his eyes, who knew the question was a mooted one, that it had

never been satisfactorily passed upon, that Nares on his return and his Staff-surgeon, Moss, did not exactly agree on it, and that some people even insinuated that he did not see ice of this character at all. Of course I cannot agree with these latter. A man may believe we do not tell the truth, but we cannot argue with him if he will not allow our premises. In regard to that ice I watched it very carefully, and I believe I have a satisfactory method of accounting for its formation, and perhaps not so satisfactory a method of accounting for how it came just where it is. But on these questions men of scientific standing will be able to pass more fully and completely than I can.

As a general rule Arctic ice does not form to a greater thickness than five feet. I know that in some places in the interior of Siberia and the United States it reaches to as great a thickness as in the Arctic seas by direct freezing. When you come to certain other latitudes you find ice forms under special conditions to a thickness of seven or eight feet. It seems to be rather a peculiar circumstance, as the result of my investigations and that of persons of other missions, that this ice increases in thickness up to the middle or end of May. It does not make much difference about the latitude. A distance of 1200 miles does not seem to have much effect on the time when the ice stops growing thicker. Ice, of course, of greater thickness is seen in Baffin's Bay, Greenland Sea, and other parts of the Arctic Sea, ice formed by what we call over-running or under-running; that is to say, these floes, which are usually five or six feet in thickness, are broken up into pieces perhaps half a mile, or two or three miles square, which are eventually driven together with violent force, and run under each other or over each other, and are so forced up, and when they separate part of the ice falls down on each side, to be melted by the sun, and its pools again to be cemented by frost. The forces of nature will in that manner sometimes form ice 15 or 20 feet thick, though I think it very doubtful if ice ever is thus formed much over that. It is true that under remarkable conditions bits of ice may be formed 30 feet thick, but I am speaking now of floes a mile square. Of course a floe the size of this hall may be formed to a thickness of 30 feet, but this ice which I have seen northward is of a very different character. Nares has named this ice palæocrystic ice, and I do not see why the name is not a good one. I do not believe in any second man coining another name. It is a distinctive name and a very proper one. It conveys the idea that it is ancient. Any man who has seen it knows it is ancient, the same as you know an old man or an old woman is old. People who have not seen palæocrystic ice may think that they have, but when once the real article is seen you never doubt it. I have seen more floes of this ice, perhaps, than the officers who sailed before me. They were there only one year; I was there two years, and a little further south another year. I have seen one piece of ice 15 miles long and two or three miles wide.

I will stick to the 15 miles, because I looked at the ice carefully and put it down in my note-book. There is no memory about that. Here was a piece of ice the area of which is from 30 to 45 square miles. It was 50 feet thick. That is what you may call palæocrystic ice. When I speak of a palæocrystic floe, I mean that kind of ice.

I saw another kind of ice. I speak subject to the correction of the officers of the expedition of 1875–76, but I saw ice of such a thickness and character as they never saw. I understand they call a floeberg a little piece broken off these little thin floes 50 feet thick; but in the innocence of my heart, seeing this other ice I called floebergs that ice which is all the way from 100 to 700 or 1000 feet thick. The first year I saw four of those floebergs; the next year about a dozen, and I suppose altogether we saw not far from one hundred. Since my return I have had the pleasure of seeing all the photographs of the *Challenger* southern ice, and all the original drawings while I was in Edinburgh, through the kindness of Mr. Murray, and the floeberg of the north is nothing less than the flat top iceberg of the south. Dr. Carpenter's views were put forth after his return from the voyage of the *Challenger*, and my ideas coincide with his views, that these bergs are merely detachments from an ice-cap near the pole. They will tell you down there in the south about ice 2000 feet thick. A couple of hundred feet difference in the thickness of the ice is nothing to a man who has been down in the Antarctic Sea. This ice is to be seen by every one who goes very far south into the Antarctic circle, and the ice in the northern regions is of identically the same character. When I looked at those drawings and photographs I said at once, "Those are the floebergs I have seen in the northern seas." And I learn from Mr. Leigh Smith, who had seen more of Franz-Josef Land than any other man living, that he has seen hundreds of flat-topped icebergs in the region of Franz-Josef Land. He tells me too that to the north of Spitzbergen he has seen a considerable quantity of this palæocrystic ice of Nares.

Now it was my good fortune to be able to settle the question that these floebergs of the north were ice formed on land. I found on a floeberg in Kane Sea a couple of medial moraines, which showed that these floebergs had dragged down stones, from adjacent hill-sides, as one sees now in the Alps; so that the theory as to the formation of these icebergs put forth by Dr. W. B. Carpenter has been substantiated by myself. That is all the credit I claim; but as soon as I have succeeded in proving that the floeberg in the north is a detachment from these ice-caps, I believe that I have a right to go further and say that the palæocrystic floes are formed in the same way. The idea put forth is that they are formed by gradual accretions from year to year from the snowfall on the Polar Sea. That would do very well if it was not for the question of stratification. That was the mooted point between Sir George Nares and Dr. Moss. I have never seen one of his floebergs,

with sheer ice 20, 30, or 40 feet thick, freshly broken, without stratification being evident, the lines being as parallel as could be. If you went up to within three feet of them you could not see the strata very well, but if you went off about 20 feet there the thing was plain to you. I examined a certain number of floes that had their sides glazed over that showed no sign of stratification whatever; but on cutting in to discover, I have seen seven or eight different strata in ice 27 feet high. At any rate, I shall look with considerable interest for the comments of anybody who attempts to disprove this stratification.

In regard to the formation of these floes, it has been suggested that they are formed by the snowfall coming on it in winter, then the snow melting, and then forming into ice in the early autumn. Well, this question of stratification, I think, quite upsets this idea, because I am sure neither Captain Markham, nor Captain Beaumont, nor Sir George Nares himself (I speak of the two first in order of priority, as I believe they have seen more of the general Polar Sea than any other men living), has ever seen 300 square yards of the Polar Sea that is level. The ice is in the utmost confusion. You climb up one hillock only to find another, then down into a valley, and up again and down again. The roughness of that sea is something almost inconceivable. Since that is so, I do not exactly see how, if the snow falls on a surface of that kind, it can ever resolve itself into these beautiful and regular stratified lines which we find on the floes.

Of course you will all say that is theory, but I have a little observation beyond that. While I was at Cape Sabine, although our conditions were not such as to permit men at that time striving for their lives to make many scientific observations, yet I think the old saying, "The ruling passion strong in death," applied to us as to many other people, and while we were in that starving condition along that shore I still looked with a great deal of attention and care to the ice. There are many discharging glaciers along Ellesmere Land. There is the Alfred Newton glacier, the Leffert glacier, and I do not remember which is which. One of these glaciers runs down into the sea—discharging right into Baird Inlet, with its crown, that is the top of the front part, almost touching the water. In some places it is only three feet above the water, and when this glacier is pushed out a certain distance into the sea, the ice rises and floats off, a regular palæocrystic floe, half an acre or even acres in extent. In crossing Rosse Bay I saw detachments had risen from the Leffert glacier, and one of them was about a quarter of a mile square, and the ice was sixty or seventy feet thick; and I think even those who do not agree with me in regard to the method of formation will admit that that made a very fair palæocrystic floe, so that here we have palæocrystic floes in which this stratification is apparent.

A good many people will ask why this stratification is not to be seen in icebergs, or why we do not speak of icebergs up there? Well, a floe-

berg is nothing but a flat-topped iceberg. Most of the icebergs of the Atlantic Sea come from the fiords of western Greenland: many of them do, at any rate: and there the character of the land is such that the ice discharges very rapidly into the sea: indeed, one of those glaciers there, I believe under very favourable circumstances, has been known to advance into the sea as fast as from 40 to 50 feet in a single day in the summer. As you may imagine, ice moving off land into the sea with this great velocity is subjected to a great deal of stress, and the result is that it breaks off in crevasses everywhere, as in the Alps, and Nordenskiöld will tell you the character of the surface of the inland ice is such in Greenland that you cannot travel over it without great difficulty, because it is continually breaking by stress and reforming by regelation, as Professor Tyndall tells us. But this stress and frequent breaks cause the lines of stratification to disappear.

Now, you want to know why the other strata (of the floeberg) are not broken up. That is, in my opinion, because the ice has formed on a land which is substantially level. These glaciers discharge into gradually deepening water and form these palæocrystic floes. The surface of these glaciers was such that you could travel over them without any trouble whatever. I was able to see the top of one of the glaciers, and I noticed a very peculiar thing—that the discharge of water in summer is almost entirely a surface one, that the ice never melts at the bottom, and the water that comes into Lake Hazen is simply that which flows over the top of the glacier and which melts along the edges of the glacier itself. If it was not so, Lake Hazen would be fed the entire winter through, but the surface of Lake Hazen falls eight or nine feet every winter, so that the level of it in spring is eight or nine feet lower than it is in the late summer or early autumn, and of course, if ice is formed by snow falling on it, and its summer meltings freeze, as is suggested for the Polar Sea by adverse theorists, one would think that in Lake Hazen the ice would form until it reached the bottom. But it does not, and it does not in any of the small lakes, of which I saw more than a score in Grinnell Land. I saw lakes ten, twelve, or fifteen feet deep, but it never froze to the bottom, and in Lake Alexandra, above Musk Ox Bay, the ice only formed to ninety inches. I do not think ice goes on freezing and increasing in thickness year after year. In Discovery Harbour the ice was not broken up at all in 1881. You would say that the next year it ought to have been of an extraordinary thickness, yet the ice that year was less than eight feet—7½ feet, after two winters of remarkable severity. That is about all I have to say on the question of ice.

That I have assumed to speak with a certain degree of authority about Grinnell Land arises from the fact that I served two years on the shores of Discovery Harbour and Lady Franklin Bay in command of an expedition, and perhaps I have seen as much of the land as any man living except Sergeant Brainard, of my own party. Later, as you know,

it was my fortune to lead a retreat expedition down along the east coast of Grinnell Land. Obedient to orders I started southwards on the 9th of August, following the coast, expecting daily to meet a ship; and, after having travelled 175 miles along the coast as it is measured on the chart, but nearer 400 miles, as we had to travel, from day to day never knowing what fate we should meet, our boats having constant nips, the perpendicular ice-foot rising sometimes 10, 12, or 15 feet above the level of the sea, after remarkable exertions I succeeded in bringing my party within sight of Cape Sabine. From the summit of Washington Irving Island Sergeant Rice, while I visited Cape Hawkes to take up the small remnant of a depôt left there by Sir George Nares in 1876, saw that the sea was clear, and a ship could come through. Of course, the whole world knows now, as we did not know, that six weeks before the ship for which we were looking had gone to the bottom of the sea.

About the first day of September I felt obliged to use all haste, and take those chances which a man must frequently take—which I had taken from day to day—and make one more bold push and try and meet open water 15 or 20 miles to the south, in hopes to reach the Carey Islands, where of course I knew I should be safe, touching of course Littleton Island; but after making three or four miles southward from Cape Hawkes we were beset. There it was our fate to be drifted about subject to the action of the gales and the winds for fourteen or fifteen days, when, feeling certain that the ice would never break up again, I abandoned my launch and one boat, and with two boats and a sledge started for the shore. But I was obliged to abandon my second boat the second day out, in accordance with the recommendation of every officer and man. We still strove for the shore, 11 miles distant. Twice we seemed to be able to reach out and put our hand on that shore, and turned into our bags at night feeling that when morning came we would make one more desperate effort to reach the shore, but only to be awakened at midnight by a violent storm, and to find ourselves next morning 25 miles off that shore. Still, for all that, our hearts had a certain amount of courage in them; and eventually, after being carried about to and fro by these violent storms, we reached the shore southward of Cape Sabine at Baird Inlet with one boat, but with all my party hearty and well, with every scientific instrument, with every record, with every private journal, and with everything of scientific value with which I left my station. There was something I had promised to do two years before, but, as many men know too well, in the Arctic seas it is one thing to promise and another to do, and I would never risk my reputation a second time by saying that I could make that journey or reach that shore.

I have been asked to-night to say a little about our experiences. I do not know that I can say very much, but I will tell one little story which has been told before, but which exhibits the spirit of the party.

When we had been blown off shore a second time we of course felt a little down-hearted at being 25 miles off shore in the middle of the sea, not knowing at what moment we should go to the bottom. There being a violent storm blowing, we found it necessary to drop everything that was not absolutely essential. We held on to all our food and everything of value, except such things as marine glasses. We had four marine glasses, and we dropped three, and all our telescopes but one. Everything that was not absolutely essential to life or success we dropped—in fact we dropped what you might call in these days articles of luxury. We did not have many. I felt inclined to hold on to the instruments. Among them was a bulky pendulum that was made for us. It had been swung in Washington with not particularly good results, and we had forty-eight separate sets of pendulum swings on the shores of Discovery Bay, and I had a great desire to bring the pendulum back. I am sure the officers of the 1875–6 expedition who strove to obtain similar experiments and were not able to make their clock work will appreciate my feeling. I had with me all my star sheets, all the time-observations, and I felt it very important that this pendulum should go back to Washington. Still, I did not feel that this instrument had any right to weigh down the men or to take away one single chance of their lives, so I told them frankly and freely how the matter was. Many of them were rough men; they were selected from the line of the army; fair men as education goes, but not men of great culture, not men perhaps of any great moral sentiments or elevated feeling, but still they had the spirit which most men, I think, have who have the heart to venture for three or four years into the Arctic regions; and so, when I said, "Whenever any one speaks the word the pendulum shall go, and afterwards such other instruments as you think fit," not a single man ever indicated his desire that I should drop it. There were, however, a few who spoke out freely and said, "Hold on to the pendulum, and if it goes to the bottom of the sea we will go with it." I can say with regard to that pendulum that when the Relief Squadron came on the 22nd June, the first sight that any American had of any signs of us was that pendulum, standing there and pointing towards the heavens as an indication that we had done our work and had come to the place we had promised, in order that our work might live after us even if we died.

It is difficult to speak of the hardships and privations that we had to endure during that long journey down that coast. Perhaps I can best give you an idea of our experiences by relating what was perhaps the worst of them. Of course these experiences do not come into every day of Arctic work, but I must say that during that retreat we had many not quite as bad, but with regard to which we had the same fear as to what the result might be, never knowing from one moment to another whether we might not perish. We had been cast about for

fifteen or twenty days. We came one time to a heavy palæocrystic floe, and had made strenuous efforts to make Cape Sabine. We were only six or seven miles off in the morning, and we made a desperate day's work of it, from five in the morning to about nine at night, as long as daylight was left to us; but we were unable to reach the shore. We crossed five lanes of water, separating the party every time, with consequent danger of death, and when night came and we were exhausted, we dropped down where we were, and the next day found us down by Cape Sabine, unable to land in consequence of one of the most violent gales I ever knew. The wind was at 60 miles an hour, the temperature 18 or 19 degrees of frost, and the party was as wretched and miserable as could be, when the men out around came and reported that they thought the floe we were on would break up. This was a small piece of ice compared with others; it was but a mile square and 50 feet thick, but the storm had broken off the corner about three or four acres. Then the ice crowded us still more. Two or three heavy floes pinched us badly, and eventually the floe on which we stood crumbled up like so much chalk, and the lines of cleavage passed through our tent and through the snow-house, and in the midst of this violent storm I found it necessary to pass over on to the next floe.

When these floes came together, the pressure, the confusion, and the results are something inconceivable. Two huge floes came together and these masses of ice and rubble are thrown up into mountainous ridges 50 or 60 feet high, extending for 400 or 500 yards along the floe, and then the whole ridge would drop into the sea, and there was the broken ice that you could not walk across—not large enough to hold a man. When the pressure eased up a little, so that the ice had crowded together again, leaving a rough, rugged pathway, which at ordinary times was hardly thought practicable, and feeling the necessity of passing the party, we struggled on, and in four or five minutes we were safe on an enormous floe four or five square miles in area and 70 feet thick. We then felt safe, but the affair had been so dangerous, that the last of the men who passed over nearly fell into the sea. The storm lasted forty hours longer—a day and a half—and we suffered about as much discomfort as I have suffered in my life in a given amount of time. But after that we landed, and passed our winter as you have heard.

I cannot enter into details here further than to say that we found about one month's provisions with which to face an Arctic winter and about seven or eight months ahead of us. On that we lived, eking out our scanty rations with what game we could get. During the winter we killed about twenty-five foxes, during the fall three or four small seals, weighing perhaps 150 lbs. each, and when the spring came we had hoped to be able to cross over Smith Sound some 30 miles to get among the natives. People have asked why we did not cross Smith Sound, and I might ask them what good it would have been to have

crossed Smith Sound? We had on the west side from thirty-five to forty days' provisions, and on the other side only nine days'. Of course I know if we had been on the other side we would have been able to live on game, or we would have tried to; but the real reason why we did not cross the Sound—I do not think any officer of the expedition of 1875–6 has a different opinion, and if he has I should be glad if he will express it publicly—was that I do not think any of the party could have crossed that sound at that time. When we reached there we had four boats at our disposal—the ice-boat, the whale-boat at Cape Sabine, and a whale-boat at Isabella and one at Camp Clay. But the time had come when you could work only about five or six hours a day—the 9th of October—and the sun would go on the 26th. The current runs down Smith Sound three or four miles a day. We had found by experience that we could not travel over one and a half or two miles a day with boat and provisions and everything necessary, and you can see what the chances were of crossing a strait 30 miles wide with a current running southward three or four miles a day; and when you drifted southward your strait, instead of being 30 miles, was soon about 60 miles. Every man who has had any experience in regard to the matter knows that it is impossible to put a boat through young ice—ice which would sustain the weight of a man, but which, of course, would not permit the passage of a boat; so that the young ice kept us on the west side. A good many people have the idea that somehow or other the sun shines in the Arctic circle, but the fact is we were 110 days in this wretched hut without a bit of sunlight. Indeed, for five months we had nothing but artificial light in that gruesome hut. We were packed in so that we were just able to get into it, with so little light that although sleeping with two enlisted men in a bag (having given up my own bag to a man who was sick), when one turned all had to turn, and yet for a week at a time I have not seen the face of the man on my right or of the man on my left. That gives you an idea of one phase of our life. Then our sleeping-bags, after two or three days, were frozen solidly to the ground, and we slept in from 5 to 10 and 20 degrees of frost continually. Of course we slept in buffalo bags, and the air inside thawed out; but when we left them for twenty minutes it would freeze up, and when you came back you had to thaw it out again. We had to live on 14 ounces of food, and yet we managed to keep up our spirits tolerably well. At any rate, we came through that long Arctic night, and when the sun came back to us on the 10th day of February we had lost only one man. Then I sent a man—the strongest of the party—with an Eskimo to try and reach Lyttleton Island to see if ice had formed. If it had we would have crossed in the middle of the Arctic winter on 10 or 12 ounces of food a day which I had saved, but unfortunately Smith Sound had remained open the whole winter. A month later I sent my best hunter and an Eskimo to the westward to

look into Alexander Haven, a place where Captain Nares had found abundant traces of game, in hopes that we might find some, but unfortunately there had been none there that winter; and during that trip the men showed the same spirit that they had shown at other times. I called Long to me before he left, and took a wretched bit of rag and seal-oil and made a light and had him examine the map very carefully, and told him what we wanted to know in regard to that region to the westward. I said, "Although you are not going out on a geographical expedition, but on a hunting expedition, yet remember that we have scientific work to do, and I want you to keep your eyes open, and if you do die, leave a name behind you by discovering something to the westward." My friend Sir George Nares was fortunate enough to extend Hayes Sound 20 miles to the westward, and Sergeant Long went 20 miles beyond him. That shows our disposition to do what work we could.

I feel I have already trespassed too long on your time, and it only remains for me to draw a slight contrast between to-night and this night two years ago. At that time I was at Camp Clay, on the north side of Buchanan Strait, on Ellesmere Land. Looking northward from our station, we saw that Grinnell Land of which I have spoken briefly and incompletely here to-night; but, as you may well know, our hearts were in the south-land at that time. It was the darkest day of the year, the time when the sun turns to the north, and on that day I think, of all days in the winter, except perhaps Thanksgiving Day, our hearts were filled with joy, delight, and pleasure, that mid-winter had come, and that we were still twenty-five living men, and could look forward with hope and believe that there was a future for us, that there was something for us to do, that the scientific work we had done all through that winter, reading our barometers and making other observations, would bear its fruit, and that we would come back to tell the world of it. Although, for the greater part of the expedition, the bright hopes of that day proved to be a vain and delusive dream, yet for me it has been a reality, and I feel I owe my thanks to this assemblage as a representative one of England for the more than kindly feeling, for the deep sympathy, for the undercurrent of feeling that there was on the part of England towards the men who were lost in the north. And I owe thanks too for the advice that British explorers tendered—advice which was good, coming from their practical knowledge of the north, and the spirit which animated one at least of the previous expedition to again risk his life there. Of these things, and for these things, I am mindful, and desire to return my thanks, and still more that so many ladies and gentlemen have come here to-night to see me as a representative American, perhaps as a representative Arctic traveller and explorer, or as a representative man. In any and all events I have to thank you for that.

You may say, as very many do, what is the use of these crowded

assemblages? Why do we go to see and to listen, to do this thing, that thing, and the other, in honour of these men? What particular or especial interest have we in it? And, indeed, many times in the far north we asked that question, which I am sure many persons here to-night have asked themselves, "What is the good of life? What comes out of it? Why should we live? Why should we suffer? Why should we strive through this winter? Why is it not easier to pass out of the world?" In regard to that, there was something in us that told us that we should come back, and I am sure that in the years to come, as in the years gone by, distinguished and cultured assemblages such as this will meet to do honour to men who have in perilous times had the courage to act like men, to live, and to come back again to the world.

Admiral Sir Leopold M'Clintock said that all present would recollect the feeling of anxiety which took possession of the public mind of England, when some two years ago it became known that the American Arctic Expedition was in peril, and the earnestness with which the progress of the Relief Expedition was watched. Englishmen had had their own experience of Arctic Relief Expeditions, and felt great satisfaction when they found that their own *Alert* was to take part in the American search. They also remembered the feeling of relief experienced when it was announced that the search had proved successful, in so far as success remained possible for it. The Greely Arctic Expedition was the fifth which had wintered in Smith Sound. Although the coast upon which he landed had been previously explored, Major Greely's indomitable perseverance, energy, and powers of observation had prevented his coming away empty-handed; he had brought back an extended knowledge of the shore-line to the north-east of Greenland, had explored the interior of Grinnell Land, and had shown that that region was tolerably well stocked with animals, and that it was formerly occupied by human beings, whose stone huts still remained. Still, he had not touched the most northern limit of the migrations of human beings, or animals. It was more easy to believe that the musk oxen found on the north-east of Greenland had come round the extreme north, than that they could have come up round Cape Farewell, its south extreme, or across the interior, which was all glacier. He wished to express his high appreciation of the good geographical work Major Greely had done, and to congratulate him most cordially upon the worthy position he had attained among Arctic Explorers.

Captain Sir George S. Nares said he was pleased to be able publicly to express his agreement with Sir Leopold M'Clintock in his appreciation of the good work that had been performed by the gallantly led Greely Expedition. It was naturally interesting to the members of the 1875–6 expedition to learn what had been done by those who had followed in their footsteps, and had a longer time to explore the same regions; and especially so when the commander of the expedition, after closely studying all the previously obtained information regarding the district, had practically followed out precisely the lines of research that the 1875–6 expedition had determined on had they remained there. Over and over again Major Feilden looked wistfully to the westward towards the interior of Grant Land where the trend of the mountain ranges and their evident constitution told them that there was a vast feeding ground from which the few musk oxen that they obtained strayed towards the northern coast. The line of exploration along the north-west coast of Greenland was the natural direction that any explorer would follow on a sledge journey along the coast. It was not pleasant to speak about one's own expedition, but it was

due to the men who previously explored those regions to point out the aspect of the land when they first arrived there. The map now presented a totally different appearance from what it did then. When Captain Beaumont had to start off to the north-east along the north-west coast of Greenland nothing was known about its physical character, except that the Hall Expedition had found the ice in the narrow strait leading into the Polar Ocean broken up the whole winter. By the tide coming round the north end of Greenland they also knew that the Atlantic was not very far off, and it was reasonably supposed that the ice would break up very early in the season, if indeed it did not remain in motion the whole winter. It was, therefore, due to Captain Beaumont to mention that it was his (Sir George Nares') clog upon him, and his instructing him that he must prepare for the ice breaking up in his rear, that prevented his extending his journey as far as he otherwise would have done. In order to make sure of his return, whether the ice broke up or not, and in consequence of the enormous hummocks of ice that were pressing against the land, he was obliged to conduct his sledges along the snow slopes at the base of the hills. It was now known that Robeson Channel opened out into an enormous bay of the Arctic Ocean. Major Greely therefore correctly grasped the situation that any eastward drift of the Polar ice in the offing towards the Atlantic outlet would leave a comparatively sheltered space of ice near the shore. Consequently Lockwood and Brainard, in their magnificent journey to the east, had not to take the same precautions as Beaumont did; they had not to be so careful about their return, and they succeeded in taking the United States flag to the highest Polar latitude. He congratulated them on having done so. Although it was only three or four miles farther than Markham's farthest, still they carried off the palm, but he hoped that some day England would wrest it from them. That they were not far wrong in expecting the ice on the Greenland coast to break up early in the season was proved by Lockwood being unable to repeat his journey the following year in consequence of meeting with water-pools. Major Greely had touched upon every point that the expedition of 1875–6 had left for others to explore. He feared that Major Greely had misunderstood what was meant by the term "floeberg." Major Feilden coined the word to define a piece of *salt-water* ice with congealed snow or frozen snow-water on its surface, but of such a large size that it might easily be mistaken for an iceberg, which was a piece of glacier ice; but Major Greely coupled the term with ice which he concluded had been derived from the land, and mentions meeting with a piece of ice 800 feet in thickness with valleys 30 feet deep on its surface. Captain Markham had given a description of precisely similar ice that he had travelled over in his journey to the north. Whether, as Major Greely held, it had a terrestrial origin or not was an open question, and they might agree to differ, but if it had it was an iceberg, and not a floeberg. He would rather conclude that such a piece of ice was formed in a deep fiord, such as Clement Markham Inlet, increasing in thickness by freezing at the lower part for many years before it was driven out to sea by a summer gale. In that case it would be an unmistakable floeberg derived from salt-water ice, and would have nothing to do with glacier ice or with the land. He feared that his expressions with regard to the movement of Polar ice had been misinterpreted both by Greely's expedition and by others in the United States. The question of a navigable Polar sea was an interesting one; and probably because he combated the idea of an open Polar sea, his expedition had been accused of going to the other extreme, and advancing the opinion that there was no Polar drift at all, and that the ice was always stationary. That, however, was not their belief; on the contrary, all their actions were based on the ice being in motion, if not throughout the whole winter, at least for a longer period than in the sheltered seas previously explored. If he had not attached boats to

Markham's expedition, and warned him to take precautions against an early break up of the ice, the result of his journey would have been very different. Previous to 1875 so much had been said about the open Polar sea and an increase in the mean temperature towards the north, that they considered it advisable to counteract the idea that there was a navigable sea. Hence the term palæocrystic ice. He had been so careful about the use of that word that throughout his book it was not employed except as a quotation from Markham's journal, and yet the term had so seized on Arctic geographers that it had not only accomplished what was intended, but had led to the other extreme and had fathered upon the 1875–6 expedition the intention of implying a great deal more. They had never meant that the palæocrystic ice extended from shore to shore and was never broken up. Like other ice it broke up, and with every gale of wind the pieces moved amongst themselves and water-holes were formed between them. That, however, in no way constituted a navigable or open Polar sea, and any vessel that was taken into such pools would surely meet the fate of the *Jeannette*. At the same time the Polar sea was navigable along the shore when a gale of wind blew the ice away and left a channel; in fact, he could have taken the *Alert* eight or ten miles farther than he did. As it was, she had no protection whatever on the coast during the winter, but he was so certain that there was no break in the ice-wall farther on that he remained where he was. It was his duty therefore, to warn future explorers that if they attempted to follow the water channel they would find the ice-wall a straight line along the shore, with no breaks even when passing a harbour or fiord, and must run the risk of having no sheltered spot to get into. He firmly believed that any one who passed along that coast would find no break in the ice-wall until he reached lat. 83° or farther, to Lockwood's farthest, where, meeting the Atlantic character of the ice met with on the east coast of Greenland he might find the ice-wall broken, and consequently a shelter for his ship. He wished to say a word or two with regard to Major Greely's statement about Markham's expedition. The term that Major Greely used was that Markham's journey north over the ice was not "proper" work. All he could say was that Markham was sent forth on that wonderful journey to prove that it was an impossibility. He was quite sure that nobody would ever follow in Markham's footsteps to the same distance over the Polar pack as he attained. The most important lesson taught by recent Arctic expeditions was that there was still much work to be done, and it could be done if proper means were taken; but great care and foresight were necessary before sending vessels to battle with the Polar ice. He certainly hoped that never again would gallant men be sent to so advanced a station without ample means of effecting a retreat.

Major GREELY said he thought that Sir George Nares had put words in his mouth which he did not use, or, at least, which he had not intended to use, when he said that he (Major Greely) had declared that Markham's work was not "proper" work. If he read the orders of the British Expedition of 1875–6 aright, that expedition was sent to reach the North Pole, so that the sledge journey of Commander Markham was carrying out the particular object of the expedition, and therefore was the most "proper" work of that expedition. For his (Major Greely's) expedition, however, it would not have been proper work, because he was sent out on scientific duty, to add to our knowledge of the Arctic regions, and not to make a "tour de force" to the Pole. He had tried to make it clear that he had mistaken the use of the word "floeberg" by Sir George Nares, by stating that he had understood from the officers *since his return* that they classed the pieces broken off from the palæocrystic floes as "floebergs," and that the ice which he himself called "floebergs" was of an entirely different character. Still, the remarks he had made as to palæocrystic floes stood good. Those floes had a large amount of salinity in

them, and although his men used them for water, when they got down to the level of the sea they could no longer use them, owing to the excess of salt. Sir George Nares and himself were, therefore, in harmony with regard to that matter, but not as to how they came there. Sir George Nares thought they were formed in a fiord like Clements Markham Inlet. He (Major Greely) believed that he was the only man living who had been in Chandler Fiord, that remarkable inland fiord, where the conditions were most favourable for the formation of such ice, and yet he never found ice more than 12 feet thick there. He did not believe any ice formed over any *sea* more than 8 or 10 feet thick. Both Sir George Nares and himself were in search of the same object, viz. the determination of the method of the formation of this ice, and of course it would remain for physicists to decide which was right. He only wished it to be known that he had not lately misunderstood Sir George Nares' term, although he had previously done so in his book. He was afraid that what Sir George Nares had said might lead some people to think that he himself believed there was an open, navigable Polar Sea. He did not believe in it, but he did believe in the canon laid down sixty years ago by Parry, that no successful Arctic work could be done except along the shore of the land. He thought, with Sir George Nares, that a vessel could be pushed into the Polar Sea so far as Sherard Osborne Fiord; and although they did not agree in all details, he thought he had enunciated the same general principles as Sir George Nares—that any ship pushed further up into the Polar Sea would probably meet with the same fate as the *Investigator* did that had never returned.

Captain A. H. Markham wished to give his tribute of praise and appreciation of the geographical work performed by the American expedition in the neighbourhood of the old winter quarters of the *Alert* and *Discovery*, and to congratulate Major Greely and the survivors of his party on their safe return home after the hardships and sufferings they had endured. In reviewing the geographical work of the American Arctic Expedition, he was very much struck with the energy and perseverance displayed by Lieut. Lockwood and Sergeant Brainard in their wonderful journey along the north-west coast of Greenland, and subsequently during the time they were engaged in the exploration of the interior of Grinnell Land. The untimely loss of such a promising officer as Lieut. Lockwood was greatly to be regretted, and by none would his death be deplored more deeply than by English Arctic travellers, who could so thoroughly appreciate his sterling qualities. Knowing as he did the general conditions of the ice and snow in the region of Robeson Channel, and the difficulties of dragging a heavily laden sledge through deep soft snow, and over rugged masses of heaped-up ice, he considered Lieut. Lockwood's journey a very remarkable feat, and was surprised when he heard that it was accomplished with dog sledges. When the ice was tolerably level and smooth, and the snow was not very deep and soft, there was no doubt that travelling with dogs was much more rapid than when the sledges were dragged by men; but when these conditions were reversed, when the road was simply a mass of chaotic hummocks, and when the snow was soft and deep, it was almost impossible to make any head-way with a dog sledge. He wished to ask Major Greely how many dogs generally composed the sledge team, and what were their daily rations. He had calculated that it would take as much weight of food to keep a dog in good working condition as a man, namely about one pound per diem. He was quite of the same opinion as Sir George Nares regarding the indiscriminate use of the term "open Polar Sea." It naturally conveyed the idea of a broad expanse of water, unencumbered by ice, and therefore presumably navigable for a ship, whereas perhaps only a tide opening, polynia, or pool of water might have been seen. He wished to congratulate Major Greely on the way in which his winter arrangements were

organised, and the perfect health he maintained amongst his men, keeping them for two years entirely free from serious sickness, from frost-bites of any importance, and from scurvy. This reflected the greatest credit on the care and attention he must have devoted to each individual member of his party. The retreat from Fort Conger to Cape Sabine was conducted with wonderful skill and ability. He also desired to express his admiration at the manner in which the Relief Expedition was carried out by Captain Schley, who took his ships through Melville Bay, and brought them to Cape Sabine almost in the very nick of time. The salvation of the survivors was entirely due to the perseverance, energy, and seamanlike qualities displayed by Captain Schley and his men, and he sincerely hoped that that officer's work would not be forgotten by geographers, when the general results of the expedition were considered.

Major GREELY said that Lieut. Lockwood had only seven dogs, which had 24 oz. of food per day, or half the sledging ration of the Expedition of 1875–76, which was 48 oz. per man. The dogs came back weighing within a fraction of a pound of what they did when they started. No doubt Captain Beaumont would be surprised at the rapidity with which the dog sledge and party reached Cape Bryant. His (Major Greely's) men could not have hauled what Beaumont's men did, but they went with dogs. A man could not haul 150 per cent. of his own weight, but a dog could, and when the farthest point was reached half the dogs could be killed, and the other half could do the return journey. The second year, when he was sent out with ten good dogs, Lockwood made a trip in six days to the Polar Sea, which had previously taken 26 days, and which Beaumont required 30 days to accomplish. That seemed to settle the question of man and dog for sledge work.

The PRESIDENT said he was quite sure the whole audience felt just as proud of Major Greely as if he had started from London instead of from Washington. They were under a deep debt of gratitude to him, as he had to catch the steamer at Liverpool to-morrow morning, and in spite of the shortness of his time he had given them the pleasure of hearing his address.

Major GREELY said it was with a grateful heart and kindly feelings to all England, that he turned his face toward the great Republic of their brother Anglo-Saxons beyond the sea.

Further Notes on "Mont Everest."

By DOUGLAS W. FRESHFIELD, SEC. R.G.S.

IN the present note I propose, in continuation of General Walker's interesting contribution to the last number of the 'Proceedings,' to complete by the addition of further details the story of the invention of that curious hybrid, *Mont Everest*. I shall next endeavour to show what remarkable and embarrassing results may be obtained by a further and rigid application of General Walker's geometrical test to the panoramas published in the atlas to the Schlagintweits' 'India and High Asia.' This inquiry may suggest doubts whether the test in question can properly be accepted as destructive, not only of the scientific exactitude, but also of any pictorial and topographical value in the panoramas in question, and further, whether the failings in the panoramas are sufficient in themselves to do away with all claims

on the part of their author to be heard as a witness on a matter which would generally be considered within the scope of an experienced mountaineer or alpine guide—the recognition of a great mountain group from various points. I hope to find room in passing for a few general remarks on the principles of geographical nomenclature.

The new name of *Mont Everest*, given by Sir Andrew Waugh early in 1856 to the highest measured summit of the East Nepal group, was in October of the same year challenged by Mr. Hodgson, writing from Darjiling. He declared * that, having lived for twenty years as Political Resident in Nepal, he knew the mountain in question well by sight, both from the border of Sikkim and the "confines" of the valley of Khatmandu, and that it had various native names, amongst which he gave the preference to Devadhunga, "The Abode of Deity."

"This great mass," wrote Mr. Hodgson, "is visible alike from the confines of Nepal proper (the valley), and from those of Sikkim, and all the more unmistakably because it has no competitor for notice in the whole intervening space. It is precisely half-way between Gosainthan, which overlooks Nepal proper, and Kangchan, which overlooks Sikkim."

Mr. Hodgson's and Sir A. Waugh's memoranda were read at the Royal Geographical Society's meeting on May 11th, 1857. Sir George Everest was present, and stated that as a mark of the esteem of Indian surveyors

"the proceeding was grateful to him personally. Yet he must confess there were objections to his name being given to this mountain which did not strike everybody. One was that his name was not pronounceable by the natives of India. The name could not be written in Persian or Hindi, and the natives could not pronounce it. It would be confounded with that of O'Brien, and the hill people would probably call this mountain Ob'ron."

Sir R. Murchison had previously expressed his hope that whatever the peak was called in India, it might in England bear the name of Everest. Sir A. Waugh, however, was not satisfied to leave Mr. Hodgson's protest unanswered, or to acquiesce in Sir George Everest's deprecatory suggestions. He called—not on independent travellers such as Sir J. Hooker or Hermann Schlagintweit, not even on the Resident who had succeeded Mr. Hodgson in Nepal, but—on five of the most eminent surveyors on his Staff to reply to Mr. Hodgson, and four of their reports were published in vol. ii. of the Royal Geographical Society's 'Proceedings.' None of these officers appears to have been at Khatmandu, and the weight of their remarks seems to me to be further diminished by the fact that they were summoned not as impartial jurymen but as subordinates to support their chief. They confidently denied that the 29,002 feet peak is visible from Khatmandu itself, which was not to the point, as Mr. Hodgson's statement was that it is visible

* 'Journal of the Asiatic Society of Bengal,' 1856. 'Geographical Proceedings,' vol. ii.

from the *confines* of the Khatmandu district. And they also denied that it is visible from the frontier of Sikkim, which is true only if we take that frontier not to include the ridge south of Singalila, whereas Tonglo is spoken of as on the "confines of that province" by Sir A. Waugh himself. But I have not space to examine in further detail these minutes. Their purport may be most fairly summed up in General Walker's own statement :—

"The great mountain masses of which it (29,002 feet) is the highest pinnacle are known to Nepalese and Tibetans by various designations, of which Devadhunga, 'the home of the gods,' may well be accepted as most in harmony with the religious instincts of the people of the country, and also as known to Indians and Englishmen."

I shall return presently to this valuable admission.

On January 11th, 1858,* the minutes of the four officers were read to the Royal Geographical Society. They elicited from Sir Roderick Murchison the following enigmatic response :—

"I cannot conceive military engineers performing any duty more grateful to themselves than that of testifying to the merit of their former chief by attaching the name of Everest to the highest mountain in the world.

With this polite evasion of the point at issue the discussion appears to have for the time ended. It was resumed and a new direction given to it through the publication, in 1861, of the results of the travels of the Schlagintweits. In 1855 H. Schlagintweit visited Sikkim, and passed along the high ridge beyond Darjiling, sketching and taking observations of the "great Nepal mountain" from Sinchal and Tonglo, and finally delineating the panorama from Phalut, some miles north of Sandakphu, on the Singalila spur. General Walker thinks that Schlagintweit never distinguished "Everest," and that his great peak is Makalu. Notes extracted from the Schlagintweit MS. sent me by Dr. Emil Schlagintweit seem to me hardly reconcilable with this hypothesis. Schlagintweit describes the great peak as like "the Jungfrau as seen from a very great distance." The drawings and descriptions of Makalu hardly recall the Jungfrau, while the sharp snow-peak on the top of cliffs of Colonel Tanner answers well enough to the famous Swiss mountain. Again, Colonel Tanner writes that Makalu is composed of "very light-coloured," "Everest" of "very dark-coloured rock," and H. Schlagintweit speaks of the "high black mountain in Nepal." I incline, therefore, to believe that even though the name Gaurisankar on the Phalut panorama should prove, as seems probable, to be wrongly placed, the peak recognised on the spot by

* The statement in the 'Encyclopædia Britannica' (Geography) that it was in 1848 that the name and height of "Mount Everest" were brought forward is obviously a misprint. The measurements were published December 18th, 1855, according to Schlagintweit.

Schlagintweit as the highest, and computed by him at 29,196 feet, was the 29,002 feet summit of the surveyors. But too much importance may be attached to this confusion between two neighbouring summits. That the Breithorn, the Saasgrat, and the true Monte Rosa were not so very long ago alternately pointed out to travellers as "Monte Rosa," did not prove that Monte Rosa was wrongly named. Nor can a similar confusion prove that the great Nepal peak is wrongly named Gaurisankar or Devadhunga.

Two years later H. Schlagintweit visited Khatmandu, and drew the panorama from Kaulia, a neighbouring hill 7000 feet in height, and 108·6 miles distant from the 29,002 feet summit, that is, about the same distance as Cuneo from Monte Rosa.* He, as Mr. Hodgson had done before him, identified to his own satisfaction one of the summits visible as the "great Nepal peak," and obtained for it from natives the title Gaurisankar, "the bright, or white, bride of Siva," which was subsequently confirmed by Indian pundits. From their account of its appearance it seems probable that the peaks noticed by Mr. Hodgson and the German traveller were identical, but it is open to any one who likes to dispute this.†

As to the identity of a mountain conspicuous from the confines both of Sikkim and "Nepal proper," Hodgson and Schlagintweit are fellow-witnesses. Nor are they necessarily at variance as to its name; for Hodgson is careful to state that he got the name Devadhunga at Kuti, and not in the Khatmandu district.

General Walker, however, here steps in and asserts that the mountain H. Schlagintweit drew from Kaulia and heard named Gaurisankar cannot be the "great Nepal peak." He has recently examined minutely in the atlas (part ii.) to the Schlagintweits' English work the panorama of the view from Kaulia, and the chart showing the positions of the principal peaks given with it. He notices—and it is, I believe, the first time the point has been taken—that in the panorama the names of some minor peaks (XVIII., XIX., XX.), which would be visible on the right of peak XXI., are attached to summits seen on the left of it.

This error, I find, does not extend to the accompanying chart, and the false identification is omitted in the reduced panorama published with the German edition of the travellers' work.

General Walker further suggests that an intervening crest known as XVIII. (22,000 feet) might have covered the 29,002 feet peak. From Khatmandu itself it might, but from Kaulia there is a difference of

* From the ridges of the Maritime Alps behind Cuneo the individual peaks of the Monte Rosa group are most plainly recognisable. Some of the summits on the farther side of the watershed (e.g. the Weisshorn) are well seen. From one of the summits of the Orteler group I have, with Mr. F. F. Tuckett, recognised Monte Viso, distant 210 miles. 'Alpine Journal,' vol. ii. p. 145.

† See Schlagintweit's 'India and High Asia,' vol. iii. p. 193, and Atlas, Part II., 1861. 'Indien und Hoch Asien,' vol. ii. p. 253, 1871.

nearly three degrees in the bearings of the two mountains. I gather from official maps that there is hardly half a degree difference between the bearings of Makalu and the great peak from Tiger Hill, near Darjiling. Yet we know from an equally official sketch that the great peak stands clear of its rival. I cannot, therefore, bring myself to share General Walker's firm belief that owing to the distance and configuration of the chain it is extremely improbable that the great peak is seen (not, mark well, from Khatmandu itself, but) from the confines of the Khatmandu valley. The mountain is ten miles nearer than it is to the spot whence Colonel Tanner observed the stratification of its rocks, and that it had exactly 190 feet of snow on its summit! Great peaks are apt to turn up very unexpectedly, and (like great men) the farther you are from them the more they assert their pre-eminence.

Again, General Walker notes that in the Schlagintweit outline the great peak is, in comparison to a nearer neighbour (XXI., 19,560 feet), made 35′ too high in vertical elevation. This result is obtained by using the formula adopted by the Indian Staff in computing the height of distant objects, and then measuring on the outline the difference between the two summits. Whereas the nearer peak should rise above the horizon 1° 57′, and the more distant 1° 32′, the peak named Gaurisankar is, on the outline, about one thirty-fifth of an inch higher than that identified as XXI.*

It must be remarked here that no observations fixing the exact geographical position of Khatmandu (or consequently of Kaulia) have as yet been published. These calculations, therefore, in so far as they are based on distances, rest on an uncertain foundation. Captain Montgomerie, in his 'Report on Trans-Himalayan Explorations, 1865–6,' comments on Hermann Schlagintweit's failure to fix with precision the longitude of Khatmandu.

It may also be permissible to doubt whether the effects of terrestrial refraction are at all times sufficiently uniform to be embraced in any single formula, and more particularly whether a formula adapted to observations taken in the plains would be equally accurate in the hills. I believe different allowances for refraction are made in the Indian and Kashmir surveys. A scientific friend assures me that in the far north the apparent height of the same mountains will vary to an astonishing extent. This effect, however, may not extend to the skirts of the tropics.

But "Ne sutor ultrà crepidam": a public school education has ill fitted me to discuss questions of geometry with skilled surveyors. It is wiser to bow at once to the late Surveyor-General's authority, and to accept his criticism as it stands, that is, to admit that the "Gauri-

* In the tracing from the original drawing sent me by Dr. Emil Schlagintweit, Hermann's surviving brother, and reproduced among the illustrations, this difference disappears, and the two peaks are apparently level.

sankar" of the engraved panorama is one-tenth of an inch higher than "Mont Everest" would appear. But having done this, does it become as obvious as General Walker supposes that the peak H. Schlagintweit saw "cannot have been Everest"? I do not think so.

The Kaulia panorama was drawn on a very much larger scale—78, in place of 30 inches in length. Probably the original drawing was to some extent corrected by more or less accurate measurements obtained with the theodolite. Both in the note under the plate, and in the German 'Reisen,' we are told with some detail how the panoramas were produced. We are also warned * that slight differences will be found "between the angles of bearings in nature and those on the plan, chiefly in the lateral parts." After reading these passages it appears to me far from improbable that the Kaulia panorama may be rather pictorially than scientifically accurate, that geometrical may have been sacrificed to artistic truth in favour of the more lofty mountain. In the case of a distant peak, the artist is always tempted to exaggerate; for the measurable space it occupies on the horizon is far from commensurate with the impression it makes on the spectator whose experience enables him to appreciate the meaning of delicate gradations of colour and fine details in structure. Such a primary exaggeration may have escaped correction either through incompleteness in the theodolite observations, or carelessness in their application, or from the technical difficulty at the corner of a sheet referred to above. That there must have been considerable carelessness in the preparation of these sheets of the atlas is rendered evident by the obvious discrepancies between the charts and panoramas. It will be most to the point, however, if I prove the companion panorama, taken from Phalut, to be inaccurate in the sense and to the extent here suggested. In the footnote below,† I have shown how General Walker's test may be extended and so used as to indicate that the fact that a peak is, in the engraved and reduced panoramas, made higher than it really is cannot be accepted as proof that it was not visible and correctly identified. Indian surveyors have long asserted that the Schlagintweits' scientific work is far from infallible.

* 'India and High Asia,' vol. ii. p. 265.

† I have had General Walker's test applied to another of the Schlagintweit panoramas, that from Phalut, selecting two peaks whose outlines and relative positions are too well known to allow of any reasonable possibility of a false identification. The results, following Schlagintweit's chart, are as follows. From Phalut (12,042 feet), Kanchanjanga (28,156 feet), 33·5 miles distant, will have a vertical elevation (disregarding seconds) of 4° 59′, Kabru (24,015 feet), and 27 miles distant, of 4° 38′. The true difference will be 21′. But the difference in the panorama is over 1° 40′. Therefore, according to General Walker's argument, the Kanchanjanga of the panorama is not that mountain. But this is absurd, for it obviously is. According to the figures given in 'India and High Asia,' vol. ii. p. 291, the distances are slightly greater, but not sufficiently so as to affect materially the results or the argument. Here Schlagintweit has obviously sacrificed scientific truth in order to make the loftier summit look its height.

General Walker's argument on this point appears to be based on the assumption that it is.*

General Walker also points out that in the chart "the ray to Everest falls between the rays to XX. and XXI., which is impossible." This is true, but it may be the minor peaks which are wrongly identified. Any inaccuracy in the position assigned to Kaulia itself would help to produce such confusions in the lines drawn from it.

I cannot admit that General Walker has as yet finally overthrown H. Schlagintweit's identification, supported, as it is to some extent, by Mr. Hodgson's and other evidence. But I am very ready to allow that he has shown that it requires confirmation before final acceptance. Mr. Hodgson had twenty years' knowledge of the country, and those who have read the preface to Sir J. Hooker's 'Himalayan Journals' know how highly his scientific attainments are valued by a very competent judge. Whatever failings may come to light in the results of his scientific observations, Hermann Schlagintweit was a man of considerable mountain experience. I shall probably, and not unnaturally, be told that I overestimate the rude faculty gained by such experience. Possibly I do; but the faculty exists: just as the Highland shepherd knows his individual sheep, many mountaineers learn to recognise individual summits, and to estimate the difference between their heights. Eyes were made before instruments, and have done some service in their time. Parnassus was known all over Greece, and Olympus was the recognised "abode of Deity," long before theodolites were thought of. The alpine climber can distinguish Monte Viso or Monte Rosa from over 100 miles off, as surely as Leith Hill from the Brighton line. He could never for a moment from any distance confuse appearances so far as to mistake the "silver spearhead" of a great mountainfor a "very moderate hill." But there are mountaineers who do not acquire this faculty. Hermann Schlagintweit may have been one of these exceptions. Both he and Mr. Hodgson may prove to be altogether wrong. If General Walker can find a respectable claimant for the name Gaurisankar other than "Everest," it will go far to settle the question. But what is now wanted is surely not disputation on documents from people who have never been on the spot, but the direct testimony of competent eye-witnesses. As yet the only direct evidence is all on one side. Before long some more data sufficient to settle the question ought to be forthcoming. What do the recent residents at Khatmandu, Mr. Girdlestone and his successor, say?

Meantime I would point out that Schlagintweit's testimony, even

* Dr. Emil Schlagintweit informs me that his brothers' observations are recorded in detail in six MS. volumes in his possession, and that the original panoramas are now deposited at Munich. He has kindly sent me some extracts bearing on the two panoramas in question. The vertical angle obtained for "Gaurisankar" from Kaulia is not among them.

as to the name of the great peak, is not entirely unsupported. The authoress of 'The Indian Alps' (Longmans, 1876) writes as follows in describing a view seen from the Singalila track (p. 366):—

"Suddenly there is a loud and simultaneous exclamation of 'Deodunga! Deodunga! Gaurisankar!' from my attendants, all apostrophising it in their different dialects, as the magnificent spires of Mount Everest again burst unexpectedly upon the view."

Is this fact or feminine fiction? If the latter, it is strangely circumstantial, and the context makes it even more so. But I give the evidence with all reserve and for what it may be worth. For the general topography of the work is not of a character to inspire much confidence in the author's passion for "faultless fact."

Again, Sir Joseph Hooker, in his 'Himalayan Journals' (1854) describes the appearance from four points of what there can be no doubt was the group crowned by the 29,002 feet pinnacle.

"A white mountain mass of stupendous elevation, at 80 miles distance from Tonglo, called by my native people Tsungau, in about lat. 27° 49′ and long. 86° 24′—perhaps the one measured by some of Colonel Waugh's party, and reported upwards of 28,000 feet—the only mountain of the first class between Gosaintan north-east of Katmandu and Kinchinjunga."

Two of his points of view are within eight miles of Sandakphu, mentioned by Colonel Tanner as the best view-point for the great mountain, and if the longitude given, 86° 24′, is thirty minutes out, Sir Joseph Hooker's estimate of its distance shows that the "2" is a misprint, and that "54′" should be read.

I am not prepared to assert that Tsungau = Sankar (or Sunkur, as H. Schlagintweit spells it in his MS.), although Mr. Hodgson, to whom reference has been made, is of this opinion; but here is proof, at any rate, that a native name was used for the group before that of Everest was assigned to its crowning pinnacle! And I may note also that the adjacent summit (XIII.) has had a native name, Makalu, found for it by the surveyors, despite its situation in the forbidden territory of Nepal, only twelve miles less distant.

I have put forward the facts as far as I know them, but I shall hardly be sorry if I fail in my argument, in so far as the assertion that Gaurisankar is the proper name for the great Nepal peak is contained in it. If I succeed in showing that the mountain has an appropriate native name, I shall consider my case won. And General Walker has, I consider, proved for me this—the material point at issue—by admitting a native name for the group, the noblest name man can give—Devadhunga, "The Abode of Deity!" Let me quote again his exact words:—

"The great mountain masses lying between the Bhotia Khosi and the Arun rivers, of which it (29,002 feet) is the highest pinnacle, are known to Nepalese and Tibetans by various designations, of which Devadhunga—the home of the gods—

may well be preferred as most in harmony with the religious instincts of the country, and also as known to Indians and Englishmen."

General Walker, however, proceeds:—

"But we do not know to what extent of region this name applies, whether to the whole mass or to a single peak, or, as is most probable, to a group of the most prominent peaks which are seen from Nepal and the British Provinces. What Waugh named was the pinnacle itself, not the general mountain mass, and for this reason he called it 'Mont Everest,' not 'Mount Everest.'"

Here, so far as I understand the Surveyors-General, I must join issue directly. I am confident that no one intimately acquainted with the growth of European mountain nomenclature will consider this plea valid. How can the loftiest pinnacle be sure of getting a distinctive name before science has ascertained that it is the loftiest? *Where it has none the proper and natural process is for the name first given to the group to be gradually confined to the crowning crest.* Thus the Monts Roëses (ice mountains) of earlier centuries have given a name to Monte Rosa. The same thing has happened in the Bernina, the Adamello, the Presanella, and Rosengarten groups within my own memory. A friend of mine was setting out from the shepherds' huts not so long ago to climb the noble Monte della Disgrazia. "Ma qui è la Monte della Disgrazia," said the shepherd when told his purpose.

What Sir A. Waugh meant by introducing the French form "Mont," what possible distinction can be imagined between "Mont" and "Mount," is altogether beyond me. If local usage is in question, *Mont* in the French Alps means sometimes a pasture (Mont-en-vers, Mont-riond), often a pass (Mont Cenis, Mont Genèvre, Mont Iseran, Mont St. Bernard), and less frequently a summit (Mont Blanc, Mont Pourri). In the Italian Alps, *Monte* distinguishes the spring and autumn meadows and pastures from the higher midsummer pasturages, the true Alpi. *Alpe* in Tuscan literature often means the top of an Apennine, as Dante critics ought to know. In literary use the French "Mont" and Italian "Monte" are equivalent to our word "Mount," as it is employed in Bible English and by English-speaking people in North America and New Zealand, as well as by the department over which General Walker himself presided during his presidency.*

The true principle of geographical nomenclature is surely that set out by Sir A. Waugh and quoted by General Walker—that local and national appellations should prevail. Travellers are often far too prone to indulge their sentiments or their vanity, to attest their gratitude or their expectations, by engrafting exotic names on natural objects. The first requisite in geographical names is that they should be appropriate,

* See index chart to the Great Trigonometrical Survey of India, compiled under the orders of Colonel J. T. Walker, Superintendent G. T. S., August 1870, corrected up to October 1881. Colonel Tanner, it will have been noticed (Report for 1884–5), adopts, contrariwise, the strange barbarism Mount Blanc.

that they should in themselves announce their locality and indicate some natural characteristic or human connection. Where the English race has supplanted its predecessors it has a fair claim to introduce its own names, though not to the extinction of such as already exist. Aorangi (the heaven-piercer) ought to have been left as the title of the loftiest of the New Zealand Alps, while Cook found more appropriate commemoration in some cape or harbour. But Mount Darwin and Mount Hooker are not out of place as secondary summits. The "icy privacies" of the Poles offer a very suitable field for the immortalisation of sovereigns and sailors. Uninhabited islands lie naturally at the mercy of their first discoverer's imagination—or want of it. But in the historic highlands of Asia, amidst the relics of peoples and languages that carry us far back in the story of humanity, such inventions as the "Tsar Liberator Mountain" or the "Columbus Range" are too sadly out of place. The Russians, indeed, have been great offenders in this matter. In the Caucasus they have substituted Elbruz and Kazbek—the latter the name of a petty chief—for the local names Minghi Tau and Mquinvari, in the former case introducing an unlucky confusion with the Elburz of Persia. They have put a Balkan Range east of the Caspian! *Mount* Everest (dropping the meaningless Gallicism) stands, I admit, on a different footing and has far more to be said in its favour. If there is in the name at first sight something "bizarre et presque choquant," the impartial geographer must, with Reclus, soon remember that the Great Survey of India is in itself an historical fact deserving commemoration. As far as I know its authors have made but this one exception to the observance of the good rule of adopting a native name where they could, and waiting for one where one was not at once forthcoming. Had they chosen any other summit for the exception, their discretion would hardly have been questioned.

Practically, perhaps, the matter at issue may seem a very small one—a mere matter of convenience and tastes. But ethnologically and historically it has considerable interest. Shall the greatest mountain we know stand for ever as a monument of the religious faith of the human race? Or shall the space-searching watchman who looks down over the valleys of Nepal and the plains of India light his fires at sunrise and at sunset to celebrate no greater thought and no higher fame than that of a most meritorious mathematician?

Mr. John Ball wrote some years ago:

> "With the highest estimate of the services of General Dufour as director of the admirable Swiss Survey, the writer does not believe that the name of any individual can remain permanently attached to the highest peak of the second mountain in Europe."

Mutatis mutandis, I adopt these words in the present case. And in what has taken place in Europe we may find a practical and peaceful solution for the similar question that has arisen in Asia. In a few large official

maps and Swiss books, *Dufourspitze* maintains a somewhat obscure existence; but the great public—"the poets too"—know, and will continue to know, the mountain as Monte Rosa. What would have happened if Byron, and Coleridge, and Shelley had had to write of Mont Paccard (the suggestion was actually made) or Mont Saussure instead of Mont Blanc? Fancy Tennyson's lines converted into

> "How faintly flushed, how phantom fair,
> The Dufour Spitze was hanging there!"

English and foreign geographers will, I still think, be well advised to hold to a native name for the highest measured peak, whether Gaurisankar or Devadhunga, time must decide. General Walker, if his authorities are correct, has in my opinion clearly and convincingly proved, according to the canons which have decided the naming of European mountains, the applicability of Devadhunga; he has weakened on one point, without meeting as a whole, the case for Gaurisankar; while in producing "Mont Everest" as the official substitute, he puts forward a nondescript phrase, which will only be accepted by Englishmen when they begin to talk of Mont Sion and Mont Skiddaw.

It remains for me to add a few words with regard to the published plates of the East Nepal group as seen from different points on the Singalila spur. According to the maps issued by the Indian Government and Colonel Tanner's paper, the culminating summit "gradually becomes hidden behind Makalu as one proceeds north along the Sandakphu ridge, and does not reappear until the foot of Kubroo is approached." I cannot agree with General Walker ('Proceedings,' Feb. 1886, p. 91) that these words necessarily imply that "Everest" is already completely eclipsed at Phalut.* In the first place, we must know exactly where Phalut is, a preliminary point which deserves some attention. Schlagintweit identified his Phalut with Singalila, and Hooker's with Sandakphu. Anyhow that station is not, as the late Surveyor-General's phrase may suggest, nearly half-way between Sandakphu and Kabru, but (by Captain Harman's map) one-quarter of the way, or only some eight crow's miles from Sandakphu. Captain Harman's sketch shows that the two peaks are seen apart from Tiger Hill, and, assuming his sketch-map to be correct, they must *à fortiori* both be visible from Phalut, and

* The position of Phalut is variously given. My remarks above apply to the first position. They would be strengthened if one of the others is correct. Its position on Captain Harman's sketch-map is inconsistent with the sketch from Tiger Hill issued on the same sheet in which Phalut is shown immediately on the right of Makalu.

Schlagintweit, 1861 (= Singalila? See 'India and High Asia,' vol. ii. p. 291)	Lat. 27° 13′ N. Long. 87° 59′ E.
Harman and Walker, 1882	Lat. 27° 11′ N. Long. 87° 57′ E.
Hooker, 1854 (= Sandakphu? 'India and High Asia,' vol. ii. p. 290)	Lat. 27° 6′ N. Long. 88° 3′ E.
Indian Map: 'N.E. Frontier, Bengal,' 1865	Lat. 27° 6′ N. Long. 88° 2′ E.

the total eclipse of the higher must take place near the Singalila summit slightly farther north. I am disposed to believe, after a careful comparison of the two views taken by Hermann Schlagintweit, from Phalut itself and a lower point further south-east, with the sketch from Sandakphu by Mrs. Brandis, published under Captain Harman's and General Walker's authority in 1882, that the prominent peak in the Schlagintweit plates is Makalu, and that what is there represented as its southern spur is in reality the 29,002 feet peak. The panorama is obviously more exact in detail than the chromolithograph, and the former supports this impression. It is further confirmed by the disappearance of the spur in the drawing taken farther north by Colonel Sherwill (see R. A. S. of Bengal's Journal for 1853). It is rendered almost a conviction by the picture from Colonel Tanner's drawing, in the possession of Mr. Graham, and reproduced in the illustration p. 216. The places in question, however, are so near Darjiling that there can be no difficulty, if I am wrong, in proving my error, and ascertaining what is the exact spot on the ridge between the Sandakphu and Singalila summits at which the monarch of mountains disappears.*

With regard to the second part of General Walker's note—that referring to the distant peaks stated to have been seen beyond the 29,002 feet summit by Mr. Graham and Herr Boss from Kabru—there is only one sentence on which I desire to comment. It runs as follows:—

"Nothing corresponding at all closely to the two peaks is to be met with in the maps of the Trans-Himalayan explorers, but the 'one snow' may very properly be identical with the 'very high snow peak' west of 87°, which was seen by Pandit No. 9 on the Tibetan range, north of the Dingri plateau, in much the same direction from Kabru, but about 50 miles nearer than estimated by Messrs. Graham and Boss; the 'one rock' has no representative in the Pandit's map, though a pinnacle higher than Mont Everest, and so perpendicular as to be bare of snow, must have been a very remarkable object which should not have escaped the Pandit's notice."

I have consulted the following maps: 1. Route Survey from British India into Great Thibet, compiled by Captain Montgomerie. Report on Trans-Himalayan Explorations, 1867. 2. Map from a Route Survey made by an Asiatic explorer, compiled by Major T. G. Montgomerie, in the Report of the G. T. S., 1871–2. 3. Transfrontier map, sheet No. 9, compiled by General Walker and Major Montgomerie, 1882.

In No. 1 map a great nameless peak is shown in lat. 29° 14′ N. and long. 86° 20′ E., 150 miles distant from Kabru. About 224 miles distant, in lat. 29° 32′ N., long. 85° 53′ E., "Hurkiang, a very high snowy

* I should mention that to avoid complicating the discussion I have confined my remarks to the two names already partially received into European literature, and made no reference to other native names for the mountain mentioned by Mr. Hodgson. Amongst the independent authorities in addition to Petermann and Reclus who have used the name Gaurisankar, I may mention Andrew Wilson, 'Abode of Snow,' Count Goblet d'Alviella, 'Inde et Himalaya,' M. de Déchy, in 'Petermann's Mitteilungen,' Dr. Balfour, 'Cyclopædia of India,' 3rd ed. 1885, and Professor Keane, 'The Earth,' 1886.

peak, is shown. On map No. 2, a "very high snowy peak," that referred to by General Walker, is shown south of the Sanpo, in lat. 28° 47′ N., long. 86° 55′ E., at a distance from Kabru of 112 miles. Another lofty peak is indicated about 20 miles further east. Beyond these appear the great nameless peak of No. 1, now called the Gela Peak, and in lat. 29° 27′ N., long. 85° 47′ E., the Gnangla Peak, 180 miles distant from Kabru. On map No. 3 all these peaks are shown in the same positions.

The distance of "Mont Everest" from Kabru is 78 miles, add "80 to 100," Mr. Graham's estimate of the further distance of the peaks seen ('Proceedings,' vol. vi. p. 439) and we have 158 to 178 miles. The Gela and Gnangla peaks would therefore, so far as distance is concerned, correspond best with Mr. Graham's final guess. The two peaks south of the Sanpo will, however, in my opinion, most probably prove to be the summits seen, for Mr. Graham in a letter, written while his impressions were fresh, describes the two peaks as on "the true watershed," and "at least 50 miles further than Everest."—('Proceedings' R.G.S., vol. vi. p. 69).

I must guard myself against being supposed to rely on the exactitude of impressions and "rough guesses" founded on a very hurried glimpse. But it will hardly be questioned that the inquiry how far the official maps, founded on the reports of native explorers, the only other evidence in the case, confirm or contradict these impressions, is an interesting one; and this being allowed, it is obviously desirable that its result should be completely stated.

My second remark is of no importance except in so far as it may serve to show how desirable it is that writers on the Himalaya should accept common Alpine terms in the sense in which they are employed in Europe, and how easily misunderstandings may arise—not all of them unimportant—when they do not. Mr. Graham wrote in the 'Proceedings' of "two peaks, one rock:" General Walker paraphrases "one, bare of snow," and founds comments on this paraphrase. Alpine climbers do not generally use the expression "rock-peak" to denote a summit bare of snow. The Dent Blanche is a rock-peak, but, as its name implies, it is very far indeed from being bare of snow. Definitions are proverbially difficult, but I think most mountaineers would agree with me that a "rock-peak" is a summit, of which the ridges which form its characteristic outline are mainly rock, and on which such snow as lies is plastered to its crags and does not form part of a névé.

Note on the Illustrations (p. 216).—The figures inserted in the extract from H. Schlagintweit's panorama from Phalut represent the probably erroneous identifications he introduced. There appears to me no room for doubt, on a comparison of his outline with that taken from the picture based on Colonel Tanner's sketch from Sandakphu, that the same group and the same peaks are represented in both, and that the peak marked 29,002 feet by H. Schlagintweit is Makalu, and the point seen to the south of it in both outlines the 29,002 feet summit.

GEOGRAPHICAL NOTES.

Mr. Ney Elias' Journey in Central Asia.—Mr. Ney Elias, our Gold-medallist, who has served for some years past as British Resident in Ladakh, was sent by Lord Dufferin, early last year, to Yarkand and Kashgar, with leave to pursue geographical inquiry and exploration. We now learn that Mr. Elias crossed into Pamir from Yangi Hissar, and came out on the Oxus at Warmar. He then thoroughly examined Roshan and Shignan and passed into Badakshan, and was expected shortly after to visit Colonel Ridgway and the Afghan Boundary Commission at Charshambeh, before taking up his quarters at Kashgar.

Exploration in Siberia.—Dr. Bunge and Baron von Toll, who were commissioned by the Russian Geographical Society to explore the shores of the Polar Sea and the New Siberian Islands, left Yakutsk on the 7th of April, 1885, for Verkhoïansk, where they arrived on the 18th. From this place, according to recent information, the travellers appear to have confined their explorations to the Yana river and the rivers Dulgalach and Bytantai. The upper part of the Yana river was explored by Baron von Toll, between the 4th and 26th of May; the same river afterwards was descended to its mouth by Dr. Bunge. Everywhere the travellers appear to have met with the best reception.

South-Eastern Yunnan.—An important exploration is about to be made of the south-eastern part of the Chinese province of Yunnan, by a party under the direction of Mr. Bourne, of the Peking Legation. The survey will occupy about two years.

The Nile Delta and Water.—In No. 240 of the 'Proceedings' of the Royal Society is a valuable paper by Professor Judd, on specimens of the deposits of the Nile Delta, obtained by borings made for the Royal Society, under the superintendence of the engineers attached to the army of occupation in Egypt. These borings were made at depths of 45, 73, and 84 feet respectively. The deposits thus obtained all consist of blown sand and alluvial mud. The sand-grains may be described as microscopic pebbles, with surfaces exquisitely smoothed and polished, and mostly consist of quartzose materials, derived from granitic rocks. There are also felspar grains remarkable from the fact of the slight traces of kaolinisation which they exhibit. The smaller subangular grains present a much greater variety of mineral species—granite, felspar, mica, augite, tourmaline, &c. Professor Judd considers it fair to conclude that these sands are really "desert-sand," derived from the vast tracts which lie on either side of the Nile valley, and swept into it by the action of the wind. In the mud, again, kaolin seems also to be almost altogether absent. The striking peculiarity of these sands and muds of the Nile valley, Mr. Judd thinks, is capable of a simple explanation. In the dry and barren tracts of North Africa, through which the Nile flows, the supply of carbonic acid to the water of the Nile is insufficient to produce chemical action on the rocks into which the water percolates, and so break up the compound silicates of which they are composed, the products of which would be carried away in solution, "kaolinised." The disintegration of the rocks in the Nile valley is effected by mechanical means, the most potent of which are the heat of the sun, the force of the wind, and

torrential rivers; this being the case, the sandstones will include felspar and other materials in a nearly unaltered condition. These conclusions are confirmed by a study of the composition of the Nile waters. The Nile receives no tributary between 17° 38′ N. (the Atbara) and its mouth 31° 25′, a distance of 1400 miles. During this long course the volume of the Nile is continually undergoing diminution, which must be largely ascribed to evaporation. Observations seem to show that between Siût and Cairo (240 miles) the Nile loses nearly 40 per cent. of its water when it is low, and 8 per cent. in flood. The effect of this constant evaporation should be to concentrate the saline matters held in solution. On the contrary, however, from an analysis made by Dr. Meymott Tidy, and a comparison with the waters of the Thames, the Lea, the Severn, and the Shannon, it is found that the water of the Nile, instead of containing a much larger proportion of saline matters than other rivers, in reality contains far less dissolved matter than any of the other rivers compared with it. This Professor Judd explains by the fact that the rain in the districts through which the Nile flows is sudden and torrential; there is little or no vegetation from which a supply of carbonic acid can be obtained sufficient for disintegration; consequently, the disintegration which does take place is almost purely mechanical, the resulting particles being carried away, not in solution, but in suspension. Hence the very different character of the resulting deposits. In the estimates, Professor Judd concludes, which have been made of subaerial denudation in different parts of the globe, it has usually been assumed that the action is similar to what is seen taking place in Europe and America. But the observations referred to prove that in tropical districts, where little or no vegetation exists, and the rainfall is sudden and torrential, the disintegration of rocks, though not, perhaps, less rapid than in temperate climes, is different alike in its origin and its products..

Zululand.—The Intelligence Branch of the War Office has issued a useful 'Précis of Information concerning Zululand,' with a map, corrected to October 1885. There are sections devoted, among other subjects, to geography and topography, towns and settlements, climate as affecting productions and health, the inhabitants, their character, pursuits, and languages, history and internal administration. The map is in two sheets, on the scale of 1 : 253,440—4 miles to an inch.

The Fate of Bishop Hannington.—A report of the assassination of the zealous and enterprising Bishop of East Equatorial Africa, by order of King Mwanga, of Uganda, successor to Mtesa, has been confirmed by later accounts. He was killed in Usoga, near the outlet of the Nile from Victoria Nyanza, by an armed party sent out by Mwanga for that special purpose. The bishop, in his long journey from Mombasa to the point where he fell, a martyr in the cause of Christian civilisation and geographical enterprise, appears to have followed in the main the route of Mr. Joseph Thomson, along the central valley, viâ Lake Naivasha, and to have been prevented from striking the east shore of the Nyanza, as he had intended, at a more southerly point. Three missionaries of the Church Missionary Society, long resident in Uganda, viz. Mr. Mackay, Mr. O'Flaherty and Mr. Ashe, when last heard from, were kept virtually prisoners by the king, and were daily expecting to be put to death.

The Gran Chaco.—The chief results of the explorations made last year by Vicomte G. de Brettes in the Gran Chaco were communicated

to the Geographical Society of Paris at a recent meeting. All previous expeditions in South Chaco have been directed along the River Vermejo; M. de Brettes therefore determined to explore the interior. He started from Corrientes on 10th March, 1885, and ultimately succeeded, accompanied by only two Indians of the Chunupis tribe, in traversing 420 miles of country, passing through the districts inhabited by the Mocovis, Chunupis, Velelas, and Matacos tribes. The country is flat, covered with thorny trees, marshes, and tall, sharp prairie grass. The natives are of a degraded type, cruel and hypocritical. He discovered a large salt lake, the northern extremity of which is situated in lat. 25° 57′ 06″ S. and long. 63° 35′ 06″ W. (of Paris), and the southern extremity in lat. 27° 30′ 18″ S. and long. 64° 03′ W. (of Paris). He also discovered three rivers flowing from south to north, probably tributaries of the Vermejo. He has surveyed a number of different points, and collected much information with reference to the ethnology, the fauna, and flora of the country. M. de Brettes intends shortly to start upon another journey into Southern Chaco, with the view of making a more complete exploration of the country.

Guiana.—Prince Roland Bonaparte has communicated the following information regarding the explorations of Dr. Ten Kate, the accomplished Dutch traveller, in Guiana. Leaving Paramaribo in June last, Dr. Ten Kate visited several villages on the Upper Paru, and then proceeded along the Upper Cottica and Patamaca, where he spent some time studying the interesting tribes of the Aucaners and Arrowaks, and collecting a large number of zoological specimens. These districts are very difficult of access, owing to lack of roads. Coronie, the next place visited, is one of the most beautiful districts along the Surinam river. Here the traveller made extensive excavations on the sites of former villages, but without much success. Directing his course to the upper Saramacca, he arrived at Maripaston, the residence of the chief of the Bekus and Musingas, who have lost much of their aboriginal character. On the 10th September, accompanied by M. Kalff and ten men, he set out along the canal (Wanica) connecting the Surinam and Saramacca rivers, and visited, near Ametali, an encampment of half-bred Indians, presenting a curious mixture of the Indian and negro types. After making excursions in the neighbourhood of Tibiti, the party commenced to ascend the Wayombo, a beautiful river with a vegetation totally different in character from that of all the other rivers in the colony. The Arrowaks inhabit the banks of the river, and the traveller spent some considerable time in their villages, collecting ethnological information; they appear to preserve the ancient custom of clans analogous to those of the Redskins of North America. On 28th September the party left the Wayombo for the purpose of exploring the upper course of the Nikerie, hitherto so little known, which they ascended for five days as far as the third rapid, or considerably beyond the point previously explored. Farther progress was impossible, owing to the shallowness of the river.

The region watered by the Nikerie is a well-wooded desert, absolutely uninhabited. The soil along the banks of the river is clay, but the numerous rocks found in its bed are granitic. Having rested some days at an Arrowak village, in consequence of attacks of fever, the traveller descended the Lower Nikerie, which is very uninteresting, and proceeded up the Corentin to Oreala, where he met with a party of the Warrons Indians. On 27th November he returned to Paramaribo, viâ British Guiana and Georgetown. In his last letter, dated 3rd December, Dr. Ten Kate announced his intention of again ascending the Surinam river, and then making a journey through British Guiana, exploring more particularly the Pomerun river, where he expects to be joined by Mr. im Thurn.

Surface-action of Wind-driven Sand.—In an article in the February number of the 'American Journal of Science,' on "Wind-action in Maine," Mr. G. H. Stone, of the U.S. Geological Survey, gives some striking instances of the influence of wind-driven sand in altering the surface features of a country. In Wayne, New Hampshire, for example, within the last forty years, the sand has drifted eastwards from one-half mile to nearly one mile, and up the western slope of a hill 250 feet high, and is now descending the eastern slope. In places the dunes must have travelled two miles or more away from the Androscoggin river valley, where they were originally deposited as valley-drift. Often on hill-sides a pine-growth is formed where one would naturally expect the hard deciduous trees. Investigation shows that drifting dunes have passed over the hill, and have left more or less sand as a covering of the till. Mr. Stone gives two special instances of the powerful action of sand on the surface when driven by the wind. One mode of action he refers to under the name of "till-burrowing." In certain parts of Maine, along the borders of the sands which have destroyed vegetation, considerable areas of the till have been denuded, and small bluffs formed. In 1879, on the top of a hill about a mile north-west of Maerne village, the wind excavated the till to a depth of nearly three feet, and the glaciated ledges had been laid bare for a distance of several rods. The glaciated stones of the till retained their scratches in perfect condition, showing that the process of denudation had been so rapid as not to permit much weathering of the stones or much sand-polishing. The other instance Mr. Stone refers to under the head of sand-polishing. On one side of a series of boulders at Bethel, Maine, are a series of grooves, scratches, striæ, and polished surfaces which have puzzled observers since 1861. During the summer of last year Mr. Stone was able to solve by actual observation what is known as the Bethel mystery. These carvings are due to the action of the sand driven backwards and forwards by the wind. Where the boulders are low, all parts of the exposed surface are scratched; large boulders are only scratched laterally. Every feature, indeed, of these Bethel boulders is fully accounted for by the hypothesis of sand-sculpturing under the action of the wind.

Exploration of Mount Bogong, Australian Alps.—News has recently been received at Melbourne, that Dr. von Lendenfeld, a well-known geologist and naturalist, has, with two others, explored Mount Bogong, the highest mountain of the Australian Alps, in Victoria, its height being 6508 feet. The party made the ascent by a new road from Snowy Creek, Mitta-Mitta, in three days, and spent twenty-four hours on the summit. Traces of glaciers were discovered in the valley. Some interesting

geological observations were made, and the scene from the mountain was photographed.

Australasian Geographical Society.—This Society is evidently showing no abatement of activity; quite recently we noticed a first volume of its 'Proceedings,' and now we have received a second. The number contains several instructive papers, both from the Victoria and the New South Wales branch of the Society. We note, as of special interest, a vigorous paper, by Mr. G. S. Griffiths, on New Guinea as a field for geographical research; while Mr. E. McCurr, in a paper on the descent of the Tasmanian Blacks, concludes that they were of mixed negro, but not of Australian descent. Mr. Robert Brew contributes some fresh information in the account he gives of his explorations, while pearl-fishing, off the south coast of New Guinea, from Talbot Island to Frederick Henry Island. Other papers refer to Borneo and Krakatoa, explorations in Arnheim's Land, New Guinea, and the rivers of New South Wales.

German Colonisation.—The 'Deutsche Kolonialzeitung' has entered on the third year of its existence. It is the organ of the German Colonial Society of Berlin, and is published monthly. The journal publishes a fair amount of information of geographical interest. Thus, in the January part there are several contributions to a knowledge of German New Guinea; an account of Dr. Finsch's fifth journey; a short communication, by Dr. Hann, on the climate of New Guinea. There is also a paper on the natural products, industries and trade of Chios, Chesme, and Smyrna.

Geographical Bibliography.—It may be useful to remind workers in geography, that the Berlin Geographical Society publishes annually in its 'Zeitschrift' a classified list of the geographical publications of the past year, including books, papers, maps and plans. This year's list (in No. 120 of the 'Zeitschrift') covers over 120 pages, and embraces something like 3000 titles.

THE EXHIBITION OF APPLIANCES USED IN GEOGRAPHICAL EDUCATION.

Lectures and Discussions.

Lecture III. January 19, 1886.—Mr. Douglas W. Freshfield, sec. r.g.s., in the Chair.

Geography in its Relation to History.

By James Bryce, m.p.

Previous to the Lecture,

The Chairman said the Council of the Society had long been dissatisfied with the position of geographical instruction in schools and colleges in Great Britain, and they had lately felt that their own action in offering prize medals to a certain

limited number of schools, had not been adequate in its reach, or altogether satisfactory in its results. They therefore determined to give it up, and if possible, put something better in its place. But before making any proposals, they sent Mr. Keltie to report on the state of geographical instruction abroad, and this Exhibition, and the very instructive catalogue, were the fruits of his labours. With the same object, they had taken the opportunity of the Exhibition to collect together on various occasions, as many as possible of those interested and occupied in teaching, or who had the control of education, in Great Britain, in order to learn what they thought of the present system of teaching geography, and how the subject might be given a higher place in schools and examinations. Lectures had been given by Mr. Ravenstein and Mr. Keltie, and many gentlemen had afterwards stated their views. There had been a general agreement that one thing to be done was radically to alter the conception of geography which existed in the minds of many teachers, to show them that it was something very different from the mere dry catalogues of many current text-books, and that a proper study of geography involved the exploration of a varied region of knowledge and not the mechanical perambulation of an arid and monotonous *table*land.

In order to instruct teachers, they must look to the Universities, for through them English education received its direction. As an Oxonian, he felt that the Council might be accused of wishing to add to the already too great multiplicity of the studies at Oxford, but he did not think they need do that. They would be quite contented if they could raise geography higher in the Examination Schools which now existed there. One of those Schools, represented by Professor Bryce, was that of history, and he thought that in that School political geography might be given more importance than it yet had. By political geography, he did not wish to be understood to mean exclusively or primarily the artificial frontiers that man had posted along the face of nature, or the divisions into provinces, which afforded map-makers the opportunity of turning their maps into Joseph's coats of many colours, and confusing, as far as possible, all physical features under a bewildering maze of polychromatic bedizenment. The political geography which he would like to see taught was not so much what man had done to the earth, as what the earth had done for man: how physical features had affected history, framed the pursuits of nations, directed their conquest or commerce, condemning some to comparative obscurity, while giving to others the keys of the world.

He would now introduce Mr. Bryce, who as an historian, a geographer, and a traveller, was well known to all Englishmen. They had all learned much from him about the "Holy Roman Empire." Twenty years ago, he (Mr. Freshfield) had his first opportunity of knowing of Mr. Bryce's travels. Mr. Bryce had then returned from Hungary. Since then Mr. Bryce had crossed Iceland; had climbed to the top of Ararat; had bathed in the Pacific; and had been in every direction as far as time would allow an active politician and a very busy man to wander. He had published an excellent book of travels, and in his other writings had lost no occasion of showing the important relations of Geography to History and Politics. Moreover, he had not only proved the accessibility of distant and Biblical summits, but by promoting a Bill for securing to the public the right of access to Scotch mountains, he was now doing his best to prevent the noblest parts of the Highlands of Great Britain being shut off from the nation by the selfishness of a few.

Mr. Bryce, in his lecture, said his object was to consider what were the points on which the studies of geography and history touch one another, and what was the kind of geographical knowledge which the teacher of history ought to possess in order to make his historical teaching as exact, as suggestive, and as full and complete as possible. Geography had to look on man as a part of nature, who is conditioned

in his development and progress by the forces which nature brings to bear upon him; in other words, he is in history the creature of his environment—not altogether its creature, but working out also those inner forces which he possesses as a rational and moral being; but on one side, at all events, he is largely determined and influenced by the environment of nature. There are parts of environment in which different countries and different parts of a country differ, and it was in discovering the different effects produced on the growth of man as a political and State-forming creature by the geographical surroundings in which he finds himself that this meeting-point of geography and history resides. He divided these environment-influences into three classes:—1. The configuration of the earth's surface; i. e. the distribution of land and sea, the arrangement of mountain chains, tablelands, and valleys, the existence of rivers and the basins which they drain. 2. Meteorological influences, i. e. climate, including heat and drought and winds. 3. The products which a country offers to human industry—mineral, vegetable, and animal. He then gave numerous striking instances in illustration of the effect of these various influences on national character, migration, and on the formation and development of human communities.

After the Lecture,

The CHAIRMAN said he was sure he was only expressing the general feeling of the meeting, in offering their warmest thanks to Mr. Bryce for his exceedingly interesting, widely suggestive, and only too compendious discourse. He seemed to him to have illustrated very fully and admirably a text laid down by one of his brother historians, whose recent loss was so much regretted, Mr. Green, who in the preface to his 'Short Geography of the British Islands,' wrote: "History strikes its roots in geography; for without a clear vivid realisation of the physical structure of a country the incidents of the life which men have lived in it can have no interest or meaning. Through history, again, politics strike their roots in geography, and many a rash generalisation would have been avoided had political thinkers been trained in a knowledge of the earth they live in and of the influence which its varying structure must needs exert on the varying political tendencies and institutions of the people who part its empire between them." He should like to quote the whole of this preface for the admirable sketch given in it by one, not primarily a geographer, and certainly no one-idea'd enthusiast, "of the place geography must occupy in any rational system of primary education, when the prejudices and traditions of our schools and schoolmasters have passed away."

When there had been lately among us such historians as Mr. Green, Mr. Bryce, and Mr. Freeman, there was very good hope that geography was rising to its proper place in connection with history, and of their mutual relations being fully worked out. Mr. Bryce had suggested all sorts of interesting subjects for detailed comment, did time permit. He had mentioned what Darwin said about the future possibilities of colonisation. Of course, there was another hopeful thing—that where man went he often made climates healthy which were naturally unhealthy. Take a place like Poti, at the east end of the Black Sea. In the times of the Roman Empire it was a perfectly healthy and prosperous place. Now there was a proverb that no one slept there a night without getting a fever. He had never been able to understand it until he read in Arrian that canals had formerly made the delta of the Phasis a smaller Holland.

Mr. Bryce had referred to the connection of law with geography. It would not at first sight be thought that glaciers had much to do with law, but the value of ice for export had given rise to curious questions as to the ownership of the ice, and their recent retreat had raised the point as to who owned the land from which they

had receded. The importance of water in old trade-routes might be further exemplified. In France, Lyons, Orleans, and Paris, no doubt, owed some of their importance to their being in the direct line of water communication between the mouths of the Rhone and Seine. Casaubon described how he boated up the Rhone, down the Loire, and then from Orleans to Paris by land. The Elizabethan trade-route to Persia was another instance—viâ the White Sea, the Russian rivers, the Caspian and Daghestan, which was brought into use when the direct channels of Eastern trade had been interrupted by the intrusion of the Turks.

Mr. Bryce had referred to his (Mr. Freshfield's) acquaintance with the Alps. What he had read about Alpine history had convinced him that many historians were extremely bad topographers. A century ago a French writer stated that Hannibal ascended to the top of Monte Viso to show his troops Rome. Michelet describes Francis I. and his army in 1515 as adventuring themselves on paths which had never been trodden except by the foot of the hardy chamois hunter. In reality, the French army traversed one of the lowest and easiest passes in the Western Alps, the Col de l'Argentière. In the discussions of the Pass of Hannibal, from Dr. Arnold to Mr. Copes, Brockedon was, perhaps, the only writer who had an adequate knowledge of localities now within twenty-four hours of London, and, in consequence, the physical facts were, as a rule, accommodated to the theories of the writers, and not their theories to the facts. Carlyle had set an example to historians of the study of local topography. It would also be an excellent thing if historians would also imitate him by paying more attention to the maps in their books. Those which were put into many English books were about as bad as they possibly could be. Good maps and plans were of the greatest possible aid to a history, and he hoped that if there were any publishers present, they would bear that in mind, and be very liberal to their next historian in this matter.

The Hon. G. C. Brodrick (Warden of Merton, Oxford) could echo what had fallen from the Chairman with regard to the admirable discourse delivered by Mr. Bryce. It was very strange that there should be any doubt as to the true interest of geography, but either the method of teaching it at school, or some other cause, had prevented people realising the intrinsic interest of the subject, and nothing could have been more successful than Mr. Bryce's address in bringing home to those who doubted it, how varied that interest was from the historical side. What has been said with regard to that corner of the county of Down which was mountainous, was illustrated by a little fact in connection with the upper valleys of the Dee and Don in Scotland, where he believed the old Roman Catholic population had never died out, while at Aberdeen, and in the lower valley of the Dee and Don, the population was as Protestant as that of Scotland usually was. When Mr. Bryce spoke of the division of England into north and south, he would, no doubt, agree in drawing the line rather from north-east to south-west, the east of Yorkshire and Durham having been extremely important from the earliest times. So in Scotland it was not a question of the Tay dividing the Highlands and Lowlands, but of cutting Scotland diagonally from north-east to south-west. If that were done from Inverness, south-westward, leaving Inverness on the right of the line, scarcely a single town of 6000 inhabitants would be found to the north-west, though Wick, when the fishermen were there, was, he believed, greater. When he reflected on the want of interest in geographical education, and the position which geography now occupied in education, he had sometimes been tempted to think that most people were so ignorant of it that they did not appreciate their want of further knowledge. Although they were all supposed to be taught geography in youth, he really believed that in any company of English gentlemen, only quite a minority would realise that whereas a degree of latitude was of the same length all the world over, a degree of

longitude dwindled towards the poles; and most people would be completely puzzled if they were asked the length of a degree of longitude in the latitude of London, and still more if they were asked what that represented in time, or what was the difference between a map on Mercator's projection, and one presented on a globe. He was by no means certain that the old-fashioned study of the use of the globes had not been more neglected of late years than it was seventy or eighty years ago. Speaking of the University, he felt that the subject of geography had been under some disadvantage by reason of its very utility. If it were perfectly useless, if it were some obscure corner of science or archæology, he was not sure that it would not have attained a position in the University system; but it was so manifestly useful, that what was everybody's business was nobody's business, and it had been overlooked. It was supposed that it must be taught, but as a matter of fact it was not taught methodically, and he was afraid that the modern tendency was rather unfavourable to it. Historians of the time of Dr. Arnold paid more attention to it,—not than Mr. Freeman,—but more than many historians of the present day, who went off upon constitutional and other branches of history, without sufficiently considering the very interesting relations between history and geography. He was an Eton man, and in one part of that school they were taught something of geography, and to some purpose, but, unfortunately, that part was rather low down, and by the time they left, if they did not take great care, they had forgotten most of what they had learned. As to the University of Oxford, he wished the prospect of obtaining the position for geography which it deserved, were more hopeful. At the same time he did not abandon hope. As examinations now governed everything at the Universities (and he was not one of those who regarded that as altogether an evil) the object should be to secure for geography a worthy place in examinations. He had been told that it was now under consideration whether geography should not have a substantial place in the preliminary examination which was now accepted in lieu of Responsions, or the "Little Go." He hoped that that was true, but he had always urged upon the Geographical Society, in conjunction with Mr. Bryce, though without success, the great importance of promoting the establishment of a geographical lectureship at the University. He admitted that the University ought to do it without any urging, and entirely out of their own funds; but at the same time he thought if a proposal were made by the Society, perhaps as an experiment, to found a lectureship, or help to found it, it would very likely be entertained, because it would be a substantial proof of the importance that the Society attached to geographical education. The benefit of this would not merely consist in the value of the lectures which might be delivered, but in the fact that there would be some one there whose duty it would be night and day to press the claims of the subject. As member of a Board which had something to do with these things, he had tried to get the University to establish a geographical lectureship, but, as in the case of the man in the Gospel, others stepped down before him. Certain obscure subjects had a number of advocates to push their claims, and geography was not successful in getting a definite place. Any little influence he possessed would be heartily used for the promotion of a geographical lectureship.

Sir Joseph Hooker said that one of the most interesting points in Mr. Bryce's address was his reference to the relations of the human race to its environments. It was a curious fact, that the three most degraded races of mankind, the Tasmanians, the Hottentots, and the Patagonians, were found at the extreme south of Australia, of Africa, and of America respectively. Mr. Bryce had stated that France was not crossed by any chain of mountains, but there were the mountain ranges of Central France, which, commencing in Dordogne, extended through the Departments of Corrèze, Puy-de-Dôme, Cantal, Haute Loire, and Ardèche to the Rhone, and which

might well be supposed to have had a great effect in separating the populations of the north of France from those of the south. He himself took an intense interest in geography, and he hoped he had been better taught in Scotland, where he was educated, than it appeared he would have been in England. His impression was, that what was really required was that geographical education should extend throughout the whole period of school and college. Geography was not looked upon as of no account in an educational point of view merely because it was so practical, but because, concerning itself with every branch of a liberal education, it came under no one more than another.

Mr. BRYCE, in reply, expressed his thanks for the kind manner in which his address had been spoken of, and listened to. With regard to what Sir Joseph Hooker had said about France, he fully admitted the truth of those remarks. There was a remarkable difference between the architecture to the north of the Ardennes, and that to the south. Roman influence was much more marked in the Rhone valley and Eastern Languedoc; and no doubt the existence of the Rhone and Saone valley on the one hand, and no chain of mountains on the other, had established a connection between North and South France. At the same time there could be no doubt that important influences were due to the chain of mountains to which Sir Joseph Hooker had referred. He did not think anything better could be done than to establish a readership in geography at Oxford, as Mr. Broderick had advocated.

LECTURE IV. January 26th, 1886.—Sir JOSEPH HOOKER, K.C.S.I., F.R.S., in the Chair.

On the Scientific Aspects of Geographical Education.

By Prof. H. N. MOSELEY, F.R.S.

Previous to the lecture,

The CHAIRMAN said that for upwards of a century it had been the practice of the Lords Commissioners of the Admiralty to employ one or more ships annually for scientific purposes, the chief object being hydrographical surveys and mapping coast-lines. In this way charts had been produced such as all other nations of the world put together could not match. Some of these voyages had been for the purpose of taking observations of the planets across the sun, others for noticing total eclipses of the sun, and others for magnetic surveys, while very few had been for purely geographical purposes. To some of these expeditions officers had been appointed other than naval men, to do hydrographical, geographical, zoological, and botanical work. In his first voyage Cook was accompanied, as a volunteer, by Sir Joseph Banks, who went with a large staff at his own expense, and whose labours caused him for half a century afterwards to be regarded as the leading scientific man in the British Isles, while his name was revered in every scientific circle throughout the world. The next case was that of Captain Flinders' voyage to survey the coast of Australia. He was accompanied by Mr. Robert Brown, the head of the Botanical Department of the British Museum, who, as soon as his works were published, was regarded as the greatest botanist of the day. Sir John Richardson accompanied Sir John Franklin in two of his great voyages, and the works he produced on the botany, ethnology, and physical geography of the Polar regions were without parallel. He need not do more than mention Darwin in his voyage in the *Beagle*, and Huxley in the *Rattlesnake*. Mr. Moseley accompanied the most important of all these voyages, and the only one that was fitted out for

purely scientific purposes, that of the *Challenger*, and would take his place along with the illustrious men whose names he had just mentioned.

Professor MOSELEY, in his lecture, said that it was naturally the scientific side of geography which interested him most; and he argued that physical geography ought to form part of every liberal education, as being a subject specially adapted for purposes of general learning, and as the only true basis on which can be founded a knowledge of what is termed political geography. In Germany and Austria, and many other parts of Europe, the necessity of physical geography as a subject of general education and of higher University study seemed to be thoroughly accepted. It is not only an excellent subject for teaching purposes, but is also especially well adapted for examination purposes. The energetic efforts of the Royal Geographical Society to promote geographical teaching cannot but yield considerable results in improving the position of the subject in this country, but it is most important that a further attempt to introduce the subject in any form, as a University one, should be made. At the present moment, it might not be possible to secure the represention of geography as a whole, because of the apparent vagueness of its bounds, and the attacks on all sides to which it is in consequence liable, but there might be a chance of success if the attempt were made to press the claims of physical geography. If established, it would meet with the cordial co-operation of leading geologists. Professor Bonne had recorded his opinion that special chairs of physical geography should be founded, thus dividing geology, as it were, into two parts, and Professor A. Geikie had expressed similar views. Courses of lectures on the higher branches of physical geography were now being given by Professor Hughes at Cambridge and Professor Boyd Dawkins at Owen's College, and he (Professor Moseley) ventured to suggest that the Council of the Royal Geographical Society should endeavour to secure the co-operation of the Geological Society in a joint attempt to induce the Universities to establish such professorships. He concluded by reading letters from Professor Kirchhoff (Halle) and Professor Wagner (Göttingen), who gave information which settled the question as to the wide difference between pure geology and physical geography, as taught by the respective professors of those branches of science in German Universities.

After the lecture,

The CHAIRMAN said that Professor Moseley had brought great knowledge and practical experience in an admirable manner to show how a University man would have geography introduced into University teaching; but those who were interested in this question had to go a little further. It had always appeared to him that it was exceedingly difficult to bring these subjects properly into the higher education, if the students had not received a good grounding in those branches of science on which geography was based. He was sorry to hear much disrepute often cast upon pure topography. It was of very little use teaching the physical geography, geology, or botany of a country, if the student did not know where the country was. He was strongly of opinion that geography ought to permeate the whole education from the schoolroom to the termination of the University career; every subject taught having a geographical aspect.

Professor BONNEY said he was heartily in accord with what Prof. Moseley had said about the importance of geognostic teaching as a branch of education. It was admirably suited for elementary teaching, and had a peculiar value inasmuch as the lessons learned could be constantly used in the daily walks. It was also a good subject for examination purposes, because it could not well be crammed. In order to answer the questions well the student must correlate his information, and have a

clear idea of what he was going to say before he commenced writing his answer. With regard to the practical way of proceeding, he was inclined to think that the science of geology had been growing so rapidly that no one man could master the whole of it. It would therefore be necessary before long to break up geology into three distinct branches; petrology, geognosy, and stratigraphical geology with palæontology. A rather painful lesson was to be learned by looking round the walls of the Exhibition. It was evident that foreign maps were far superior to English maps. There seemed to have been a kind of evolution in mapping; first the plum-pudding stage; then the hairy caterpillar stage; and next the graphic method of shading, and he was afraid that some of the maps exhibited had not got beyond the hairy caterpillar stage. But there was one thing more important than maps, and that was models. Some of those exhibited were admirable, but unfortunately the prices were rather prohibitive, so that the Geographical Society would do a great service to teachers if they could get decent models produced at a reasonable price.

The Rev. Dr. JEX-BLAKE (Rugby) said that no one could understand the political history of a country without being acquainted with the geographical facts that had made the towns, and he was sure there was more interest felt in the subject than was commonly supposed by those who were anxious to advance it on sound lines. When he was a boy he never dreamed of being able to get through even a Greek-play lesson, much less a page of Thucydides or Livy, without knowing the lie of the country, and certainly the interest in the subject was keener now, and more widely spread, than when he was a boy thirty or forty years ago. There were two facts which showed the keen interest in geography of one of his predecessors—Dr. Arnold. Though he died in 1842 and the Crimean War did not break out till 1854, he said that if ever Russia had to fight a European antagonist, that antagonist would be very ill-advised if she did not attack Russia in the Crimea. Dr. Arnold also picked out at a glance, approaching it for the first time, the very pass by which Hannibal must have crossed the Apennines, taking his elephants from Central to Southern Italy; and no one could read his Thucydides or Roman history without noticing that he knew how physical facts must shape political ones. He was quite sure that the Society had taken a very wise step in forming the Exhibition and having the lectures delivered. He took by no means the gloomy view of the present state of geographical teaching and geographical apparatus, adopted in some quarters; but such an exhibition as this made improvement certain in both method and apparatus.

Rev. Canon DANIEL thought that very few public schools or universities would be disposed to add geography to their curriculum if it could not be shown that it was valuable as an intellectual discipline; but the common impression was that it was of very little value in that respect, and in the Society's Reports most of the head-masters who had expressed any opinion on the subject said that the reason why geography received so little attention in the public schools was that it was comparatively valueless as a discipline. He ventured to think that this impression entirely arose from the very unsatisfactory way in which the subject had been taught in this country. If it were taught intelligently it would be found to be as valuable for purposes of intellectual discipline as any other subject included in the ordinary school curricula. If children were led to bring their geography to bear upon their history, and their history upon their geography, then geography would prove to be invaluable as a discipline. Teachers, however, were not sufficiently trained in the subject. Some of them probably had never read any special treatise on it, and yet they were expected to teach it. How could they be enthusiastic about a subject of which they knew little, and about the methods of teaching of which they knew less? Many public school masters would derive much benefit with regard to the teaching of geography if they would pay a visit to a national school or a training

college, where the subject had been taught scientifically for many years, and where models constructed by the teachers themselves were employed to illustrate the lessons. Both the students and the children were accustomed to draw maps from memory, and the Educational Department insisted upon the insertion of meridian lines and parallels of latitude. He wished to say one word in defence of English maps. Those who had criticised them had been mainly influenced by their feelings as scientific men; but the requisites of a map for a school were different from those of an atlas to be used by a student at the University or a scientific man. Many maps which were excellent from a scientific point of view would be execrable from the point of view of teaching. Mountain ranges and other physical features should be exhibited in a very forcible and striking manner. Little children could not possibly take in a multitude of details: what impressed their minds were bold lines.

Professor M'KENNY HUGHES (Cambridge) agreed with the previous speaker as to the suitableness for their purpose of our elementary school maps, and thought that it was not necessary, in order to promote the cause of better and higher teaching in geography, to begin by decrying everything English. In the exhibition around them, of course, greater prominence had been given to those foreign objects which we did not every day get an opportunity of seeing; but he thought that such publications, e.g. as Keith Johnston's Atlases, Stanford's Stereographic, and other wall maps, and those of the Ordnance Survey, would compare favourably with any foreign productions for the several uses for which they were intended. It was so often repeated that there was no geographical teaching in the Universities that he wished to point out again that in the University of Cambridge, at any rate, physical geography was regularly lectured upon by one or other of the geological staff, and that excursions were regularly made with the students in which the physical features were pointed out and explained. He thought there was a misapprehension of the conditions among those who supposed that the geographical details required for particular courses of lectures on history or zoology, or physiography or geology, could be obtained from courses of lectures on general geography in the University. The common groundwork, topographical and chorographical, must be acquired before a man comes up to the University. In his short University career he must specialise. The Zoological Professor now lectured upon the Geographical Distribution of Animals. The Historical Board might provide courses on historical geography: on campaigns, on colonisation, on the great trade routes of the world, and so on; and, in the department of geology, physical geography must always be taught.

Just at the present time, it was true that so little was done at the schools that it would answer to teach elementary geography at college. But that he hoped was only temporary. It was quite wrong to say that it did not pay at the University. It paid directly in the Tripos Examinations and indirectly in the better understanding of history ancient and modern. He would not discourage the expansion of the subject, or the founding of a chair of geography in the University. It would be a useful and interesting subject taken alone for the politician, the traveller, and the man of leisure. But the present great want will not be met in that way. For the men who require geography as a help in other studies—for their history, their zoology, their geology,—for them geography, in its old meaning, will be a subordinate subject when they get to the University. Practically they must get most of it at school.

The CHAIRMAN said that Mr. Hughes seemed to overlook the immense influence that followships in the Universities would have upon the early education in the subsidiary schools. The professorship should be to a great extent a peripatetic one, and the whole class should be taken through a considerable extent of country, so as to make the teaching practical.

Mr. FRESHFIELD said that whatever might be the case at Cambridge, he had the authority of the Warden of Merton, of Mr. Bryce, Mr. Tozer, Mr. George, and others, for saying that at Oxford, instead of the University going the right way as fast as it could, it was resolutely refusing to stir at all. What was wanted at the Universities was a representative of geography, who would secure a hearing by his wide knowledge and power of making the subject attractive. Geography would never be properly taught at the public schools until the assistant-masters who went down to them from the Universities had a liking for it; and he hoped that Dr. Jex-Blake would use his influence at the Conference of Head-masters to urge them to give geography a little more sympathetic treatment in their courses, not regarding it only as a separate subject, but bringing it into all other subjects. If the head-masters would make it a *sine-qua-non* that their assistants should have some little knowledge of physical geography, and not speak of it in disrespectful terms on all occasions, a great deal would be done towards the object the Society had in view. Mr. Moseley had spoken of the great advances of Germany and Austria in map-making, and in introducing geography into schools; but Zurich, which was the most commercial and go-ahead of the Swiss Cantons, had done, perhaps, more for geographical education than any other place in Europe. They had a beautiful large wall-map of the Canton, showing all its physical features, and admirably adapted for schools, and they put a small copy of it into every child's hand. They had also little relief maps made of pasteboard, each slip representing 100 metres, and the children were taught to construct the models. For higher education they had the splendid relief model of the Monte Rosa group constructed by Herr Brefeld and Professor Heim. Zurich owed its high standard of map-making partly to the exertions of the Swiss Ordnance Survey during the past forty years. General Dufour made a marvellous map of Switzerland, and his survey had under his successor been carried to a pitch of perfection unknown to any other country. The map was sold cheaply. England was much behind in the matter of publishing Ordnance maps cheaply and quickly, and keeping them up to date; though this was to be attributed rather to the misplaced parsimony of Parliament than to any want of energy in the staff. He might mention, as an instance, that there was no Government map in existence which showed the hills and dales of Exmoor with even approximate accuracy. The source of the Exe was misplaced about a mile. In France, and Italy too, rough but sufficiently good copies of the Ordnance maps could be purchased for fivepence or sixpence.

Mr. G. GRIFFITH (Harrow School) said he had been very much surprised at the discussion. The Head-master of Rugby had said that geography was taught in his school in an effective manner, and they had also been told that it was properly taught in the primary schools; and yet the Geographical Society had for several years been telling the world that it was badly taught in this country. How to teach geography well was a difficult question to answer. He could imagine that if the teaching of topography were attempted in the schools something might be done; but he believed the Society aimed at having physical geography taught as a separate subject, and that included not only geology, but meteorology, terrestrial magnetism, and other matters. The use of the barometer and scientific instruments, in his opinion, ought not to form part of geographical teaching, but of physics. He thought the Geographical Society had to a certain extent made a mistake in their examinations, in extending them over too large a range of subjects. At Harrow, text-books by Geikie and Huxley were used; but it was absolutely impossible to have all the subjects treated of in those books taught in a practical way, except as a part of physics, because they involved questions of heat, of light, and of mechanics. That, he believed, was one of the reasons why the schools had failed to take up the subject

in the way the Geographical Society wished. He believed that great good might be done by professors of geography at the Universities as proposed by Professor Moseley, and the establishment of such was sanctioned by the Oxford Commission of 1854.

Mr. J. R. Langler said the great mistake usually made in teaching geography was to compel children to learn from a text-book a large number of names, important and unimportant alike, in set lessons, and without any association of ideas. The main thing in learning useful geography was not to know first the "where" but the "what"—the scenery, climate, history, &c., as suggested by the pictorial part of this valuable Exhibition—otherwise the lesson became a painful infliction of mere words, instead of exciting the interest of the children. The "where" localises the idea; and the "why" is a third stage which explains causes and effects, especially in "physical geography." With regard to the establishment of chairs at the Universities, teachers would be sure to give instruction in any subject which told at the University examination. That evening a proposal was before the members of Convocation of the London University to eliminate geography altogether from the syllabus; and if examiners put mainly such questions as "What is the roof of the world?" "What do you understand by the Flowery Land?" little good would be done by retaining the subject for the advantage of a commercial people. If, however, attention was given to questions such as those Mr. Moseley had suggested, e. g. the growing of cereals, or the distribution of those plants which were especially useful to mankind, geography might be studied to some purpose. He remembered Sir Henry Rawlinson once saying at the annual dinner of the Society that he thought there were very few members of the House of Commons who knew the situation of the Bay of Fundy; but until the Bay of Fundy became important on account of a dispute about the fishing grounds, what special advantage was there in knowing its exact locality? Many names were of little use except under such circumstances, and might well be omitted from text-books in favour of confessedly important points in the geography of the world. Much time and energy are wasted in teaching minute details.

Rev. E. Hale (Eton) thought that Professor Hughes had regarded geography too much from a geological point of view, and had not clearly appreciated that it is a science of itself. The reason why the schools did not send geographers to the Universities was that geography was not recognised at the Universities. A pupil of his own who had taken both the prizes offered by the Society, wrote to him from Cambridge saying that nobody cared anything about geography there. At the school with which he was connected every boy, as the foundation of his scientific course, had a year of physical geography. That quickened the boys' habits of observation. He was also accustomed to give a few lessons on the weather chart of the *Times*, and the boys acquired a rough-and-ready idea of the way in which the Metereological Department made their forecasts. Such an interest was taken in the subject that for the last seven years the boys themselves had drawn up their own meteorological reports. Every teacher ought to be independent of his books, but often when he had not had time to finish his lectures on a subject, he had referred the boys to Huxley's 'Physiography' and he had never found that they had any difficulty in understanding it. One reason why geography was badly taught was that masters disliked the lesson. They simply took their text-book and their Keith Johnston, read a page or two, and then asked questions about it when they went into school. Taught in that way geography was not likely to commend itself to the pupils. Such a state of things would not exist if geography were recognised at the Universities.

Professor M'Kenny Hughes did not think he could be accused of regarding geography from one point of view only, when the whole drift of his remarks had been to show that the teaching of geography at the University was, and must be,

divided under several heads to suit the more specialised studies of the place. The opposition could hardly be said to come from those departments which now offered, as far as they could, the geographical teaching required for their own subjects. He had that morning lectured on the details of the physical geography of a country to which he was going to take his men in the Easter vacation. He regretted that he should have been so far misunderstood as to be supposed to object to geographical teaching because he did not believe that a particular scheme which had been proposed would best promote the end in view.

Professor Moseley, in reply, said he was sorry that Mr. Hughes had expressed himself rather strongly against his proposition; but there was a statement in Mr. Keltie's admirable report to the effect that the great opponents to the development of geography in this country had always been the geologists. He was glad to find that Professor Bonney took an opposite view, and he knew that Professor Boyd Dawkins and Professor Archibald Geikie were strongly in favour of a professorship of physical geography. No doubt geography had long been taught at Rugby as admirably as Mr. Jex-Blake had stated; but nothing more execrable could be conceived than the teaching of geography at Harrow when he was there; in fact, all the geography he was taught there was the drawing of maps from copies. Mr. Jex-Blake seemed to regard physical geography as a thing with respect to which there was no development, but the fact was that it was a subject in which most interesting work was being done every day. Until he saw a mountain in Switzerland he had no conception of the gradual rise of a mountain chain, or of the enormous area covered by it. There was not only a certain quality of study of physical geography applicable to public schools, but there was also a higher study of the subject, such as was represented in Oscar Peschel's 'Allgemeine Erdkunde.' Peschel was one of the greatest geniuses that ever lived. He not only wrote a treatise on geography, but also a most valuable anthropology, a history of geography, and a series of essays on all sorts of interesting subjects connected with geography. His idea of a professor of geography at a University was one who would treat the subject in its higher branches. At the present time there was no text-book on physical geography in England which in any way approached those published in Germany. He did not expect all the details of the subject to be taught to beginners at school. It should proceed by successive stages, the same as Latin or Greek. He believed that geography would take its proper place in the Universities before many years passed away.

REPORT OF THE EVENING MEETINGS, SESSION 1885–6.

Fifth Meeting, 25th January, 1886.—Sir Rutherford Alcock, K.C.B., Vice-President, in the Chair.

Elections—*George Edward Bowker, Esq.; Major William Broadfoot*, R.E.; *Canon George Butler; Major Arthur B. Cook; Alex. Tovey Drydale, Esq.; Samuel Mountford Gibbs, Esq.; Rev. W. S. Green; Alex. Henderson, Esq.; James Stewart Henderson Esq.; George Ainslie Hight, Esq.; Hugh Hughes, Esq.; Henry Seymour King, Esq.; Joseph Kips, Esq.; Robert D. Lunham, Esq.; Captain D. Mainland; Frank Arthur Morgan, Esq., A. F. Mummery, Esq.; Arthur Otto Sachse, Esq.*, C.E.; *Robert Elliot Steel, Esq.*, M.A.; *William Culley Stobart, Esq.*

The paper read was:—

"A Recent Journey in Corea." By W. R. Carles, Esq., H.M. Vice-Consul, Corea.

Will be published, with map, in the April number.

Sixth Meeting, 8th February, 1886.—The Most Hon. the Marquis of LORNE, K.T., President, in the Chair.

ELECTIONS.—*William Macdonald Cameron, Esq.; James Hebbes Croome, Esq.; Edward Heawood, Esq.; Alexander Hosie, Esq.* (H.B.M. Consular Service, China); *Lieut.-General Edward Kaye*, R.A.; *Alexander Macaulay Posnett, Esq.; James Harrison Postlethwaite, Esq.; Arnold Trinder, Esq.*

The following paper was read :—

"A Sketch of the Physical Geography of Brazil." By James W. Wells, M.I.C.E. Will be published, with the author's physical map of Brazil, in a future number.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—January 8th, 1886, M. ALPH. MILNE-EDWARDS in the chair.—M. R. du Caillaud forwarded two communications with reference to the Tonking question, entitled, 'L'Évacuation du Tonkin et l'honneur de la France,' and 'La monarchie française et la question Annamite.'—M. A. E. Nordenskiöld presented a copy of his book, giving the account of his last voyage to Greenland, and expressed a hope that the work might be translated into French.—A communication was read from M. Alph. de Candolle, with reference to the want of analytical tables in most books of travel; he regarded such tables as indispensable for the purpose of reference.—M. B. de Villemereuil forwarded an important letter from Captain Réveillère with reference to navigation on the Mekong river. Captain Réveillère announces that he has crossed the rapids of Sombok-Sombor in a torpedo boat, and ascended the river as far as Stung-Treng. In 1863 M. Doudart de Lagrée navigated these rapids in a canoe, but reported them impassable for steamers. Captain Réveillère further states that the gunboat *Sagaïe*, under the command of a midshipman named De Fésigny, has successfully passed the rapids. These are important announcements, as Stung-Treng is situated on the borders of Laos, and at the confluence of several rivers draining countries rich in various products.—M. Oltramare, of the Observatory of Paris, communicated some observations on the determination of the latitude and longitude of Tugurt by M. Duveyrier. The exact position, as determined by astronomical observations of M. Duveyrier, is 33° 7′ N. lat. and 3° 46′ long. E. of Paris.—The Geographical Service of the Army forwarded a list of the archæological discoveries made in Tunis by the officers of the topographical staff. These discoveries chiefly consist of Roman remains found in different parts of the country.—A letter was read from M. Duhamel, stating he had in his possession an ancient map of Senegal, by D'Anville, dated January 1727. This map indicated very accurately the different districts of this part of Africa occupied by the English, French, and Portuguese. It was not thought, however, that this map could be utilised to favour French claims in that part of Africa.—M. R. du Caillaud sent a short historical note on the rights of France along the Gulf of Arguin, and more particularly along the Bay of Lévrier.—M. Dutreuil du Rhins forwarded a paper written by M. Ponel, a member of the West African Mission, on the M'Bochi, a tribe living along the lower part of the Alima, and on the right bank of the Congo.—M. Hangsen-Blangsted forwarded a report upon the collections recently brought home by Captain Holm from the Eastern coasts of Greenland. A public exhibition of these objects has just been opened at Copenhagen.—M. Maunoir made some observations on the excellence of several geographical text-books and wall-maps, which had been presented to the Society. These included the third

volume of Geographical Readings by Professor Lamier; another volume on Geography by M. Foncin, containing eighty illustrated and well-arranged lessons, and a series of twenty-two wall-maps prepared by M. Vidal Lablache. These maps, which are about a yard square, are reversible, one side giving simply the outlines, while the other contains the leading geographical features and names in large type.—In conclusion, Mr. Cope Whitehouse made a communication with reference to Lake Mœris (Egypt) and the theories regarding it.

——— January 21st, 1886: M. Ferdinand de Lesseps in the Chair.—This was a special meeting held in the Amphitheatre of the Winter Circus for the reception of M. P. Savorgnan de Brazza, on return from his operations on the Congo. The chairman was supported by Colonel Brugère, representing M. Grévy; M. L. Robert, representing the Minister of Public Instruction; Comte de Montholon, representing the Minister for Foreign Affairs; representatives of the Ministers for the Army and Navy, M. Roma du Bocage, plenipotentiary of Portugal; delegates from several French Geographical Societies, and a large number of distinguished men of the scientific and political world. M. Ferdinand de Lesseps said he was proud to act as the representative of the Society in welcoming M. de Brazza, who needed no introduction. They had followed with intense interest his numerous journeys, and the events of the struggle from which he had brought back, like spoils to the feet of France, a territory larger than France itself. Ten years had sufficed to accomplish this great enterprise, an enterprise almost unique in history. After paying a high tribute to the courage, energy, and patriotism displayed by M. de Brazza, the chairman called upon him to address the meeting. M. de Brazza commenced by reviewing former explorations of the Congo and the Ogowé, giving the general results of his own expeditions of 1875-6 and 1879–82. In March 1883, he started on the journey now in question, having been preceded in January by an advance party, under the direction of M. Rigail de Lastours. For some months M. de Brazza himself was detained at the stations on and near the coast, superintending the despatch of stores, settling disputes and arranging his men. Meanwhile M. de Lastours had proceeded to Franceville, while Dr. Ballay, de Brazza's former companion, who had remained in Africa, was stationed at Ossika on the Alima. In June M. de Brazza started up the Ogowé, and arrived at Franceville about the end of July, where he concluded fresh treaties with the neighbouring chiefs. Here he was again delayed, owing to the non-arrival of stores and the enforced return to the coast of several of the staff. At length he was able to proceed to Dr. Ballay, then engaged in negotiations with the Bafurus, on the Alima. Treaties having been successfully concluded with these people, Dr. Ballay started with fourteen men, down the Alima, arriving fifteen days later at the confluence of that river with the Congo; thence he proceeded down the Congo to N'gantchu, where he was well received by King Makoko. M. de Brazza himself was compelled to return to Franceville to organise and expedite the transport of provisions. At the end of 1883, however, he set out to join Dr. Ballay at N'gantchu, where he arrived on 27th March 1884. After a successful interview with Makoko and his vassal chiefs, all of whom consented to place themselves under the protection of France, M. de Brazza and Dr. Ballay descended the Congo to Brazzaville, whence the latter set out on his return to Europe. Leaving M. de Chavannes in charge at Brazzaville, where relations with the International African Association appear to have been somewhat strained, M. de Brazza returned once more to Franceville in the autumn of 1884. Here he rested some time, and then started down the Alima, with the intention of exploring the Upper Congo. At the junction of the two rivers, however, he met M. Dolisie, to whom he entrusted the command of his intended expedition on the upper part of the Congo, as he found that his presence was required on the coast.

Retracing his steps down the Alima and Ogowé, M. de Brazza reached the coast in December 1884. Here he spent three months, visiting all the stations along the coast, with the view of putting matters on a satisfactory and permanent basis. In March 1885, he proceeded again up the Ogowé to Franceville, where he received an important letter from M. Dolisie, announcing that he had discovered and surveyed the Mossaka and Shanga (two tributaries of the Congo), also the upper course of the Ubangui-Nkundja, and had concluded numerous treaties with the tribes inhabiting the banks of those rivers. While at Franceville, M. de Brazza was summoned to the death-bed of M. de Lastours, at Madiville. The death of his able colleague was felt by the traveller to be an almost irreparable loss. In July 1885, M. de Brazza, after being detained some weeks at Franceville, was on the point of starting upon his proposed journey into the country north of the basins of the Ogowé and Alima, when he received a summons from the Government at home to return at once. He was consequently compelled to leave this long-cherished plan in other hands, and deputed his brother to lead the expedition. He himself, in company with M. Decazes, proceeded down the Alima and the Congo to the coast, eventually reaching Libreville on 18th October last, whence he returned to Europe after an absence of two years and nine months. M. de Brazza then briefly summarised the results of the expedition as follows:—The survey of the Ogowé had been completed; the Alima and the Congo (from Nkundja to Brazzaville) had been thoroughly surveyed; important topographical and hydrographical work had been executed on the coast of Loango; numerous astronomical observations had been taken at different points; natural history specimens of interest had been extensively collected; and, finally, he had brought home a large number of sketches, photographs, and ethnographical notes. Then referring to the economic results of his mission, M. de Brazza said that almost all the tribes along and between the Ogowé and Congo had been brought under the protectorate of France, and elevated by the influence of her civilisation, including to some extent the cannibal Pahuins. United in their common dependence on France, these tribes would be of great assistance to France in the development of the country. With regard to the future, he was hopeful. Progress would be slow, as, owing to the unhealthiness of the climate, almost everything depended on the natives themselves. In conclusion, M. de Brazza paid a high tribute to the energy, devotion, and ability of his numerous colleagues, to whom in a large measure the success of the expedition was due.—The Chairman then thanked the traveller for this interesting account of his mission, and expressed the hope that the Government would send him again to the Congo to continue those operations which had been so successful.

——— January 22nd, 1886: M. A. Germain, President of the Central Commission, in the Chair.—The Chairman opened the meeting with the announcement of the re-constitution of the Bureau for the year 1886. The following had been elected:—President, M. A. Germain; Vice-Presidents, MM. Grandidier and Cheysson; General Secretary, M. Ch. Maunoir; Assistant-Secretary, M. Jules Girard.—The International Society of Brazilian Studies, of which M. F. de Lesseps is the President, sent a copy of its rules.—M. Gauthiot communicated a letter from M. de Lemire with reference to the copyright of geographical maps. In view of the importance of this question, the Chairman requested the Secretary to bring the matter before the next meeting of the Central Commission.—A short paper was sent by Lieutenant Le Châtelier, on the Natives of Auguerut.—M. Victor Guerin laid on the table a new work, which he had just published, entitled 'La France Catholique en Tunisie, à Malte, et en Tripolitaine.'—The Chairman then announced that His Highness Prince Albert of Monaco was present at the meeting, and that he would make some observations with regard to the interesting studies made by

him on the Gulf Stream. After some remarks from Comte de Montholon, as representing the Minister of Foreign Affairs, the Prince proceeded to give an account of his experimental researches on the Gulf Stream (which will be reproduced *in extenso* in the quarterly 'Bulletin').

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Helmersen, G. v., and L. v. Schrenck.—Beiträge zur Kenntniss des Russischen Reichs und der angrenzenden Länder Asiens. Zweite Folge. Auf Kosten der Kaiserlichen Akademie der Wissenschaften. Herausgegeben von G. v. Helmersen und L. v. Schrenck. St. Petersburg, 1885: Band viii., pp. 450, with 15 plates.

This is the eighth volume of the second series of the well-known Contributions towards a knowledge of the Russian Empire, but why are the names of the editors of its first series, Helmersen and Schrenck, retained, both of whom have passed away? This volume contains important articles translated from the Russian. The first, by Count D. A. Tolstoi, is a review of the history of education in Russia during the 18th century down to the year 1782. He tells us that for the first thirty years of that century general education had made so little progress, that the so-called "cypher-schools" instituted by Peter the Great, at which he endeavoured to make attendance compulsory, existed at the end of that period only in name. In 1726 the University of the Academy had no professors and no students. That year, however, eight students from Germany entered and received their education at the cost of the Crown. Two of these, Müller the historian, and Gmelin the traveller and geographer, earned a world-wide reputation. The second part of the volume consists of two articles by M. Poliakof. The first gives the result of his anthropological journey in central and eastern parts of European Russia, undertaken for the Imperial Russian Academy of Sciences, in whose Transactions it originally appeared ('Zapiski,' vol. xxxvii., supplement). Near Tula the author found many stone implements, chiefly of the arrow-point type, in the possession of the peasants, who believed them to be thunderbolts, and attributed miraculous healing virtues to them. Not far from Murom, the home of Russia's great legendary hero,* M. Poliakof's excavations led to the discovery of human remains coeval with the mammoth, rhinoceros, and other fossil animals. These discoveries reminded him of Gmelin's town of Kostionsk (*kost* signifies a bone) on the banks of the Don, near Voronej, where numerous fossil remains were found by that traveller in 1768. (See his Travels, Russ. ed., St. Petersburg, 1771, part 1, pp. 53 and 119, and German ed., part 1, p. 34.) M. Poliakof succeeded in finding the spot with some difficulty under the changes which 110 years had brought about, but the results of his researches exceeded his most sanguine anticipations. Mammoth bones were embedded in the soil besides flint instruments of the stone age and other remains, proving that man had not only existed then, but had hunted the mammoth and exercised against that monster all his strength. M. Poliakof proceeds in his third chapter to describe his excursions in the valley of the Oka, where he found more remains of pre-historic man, and to the western slope of the Ural range, when he visited the remarkable cave of Kunghur described by Lepekhin, the traveller, at the beginning of the present century, and more recently (1875) by the members of Professor Nordenskiöld's expedition, on their return from Siberia. M. Poliakof's excavations here produced only negative results. The fourth chapter is devoted to the author's

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* Ilya Muromets; see 'The Songs of the Russian People,' Ralston, pp. 59–63.

investigations in the valley of the Volga, not far from Kazan, where stone implements of the neolithic age and fossil remains closely resembling those dug up on the banks of the Don were discovered.

The second article by the same author was originally published in the 'Zapiski' (Memoirs), vol. ix., of the Ethnographical Section of the Imperial Russian Geographical Society. It contains his account of scientific excursions in the government of Olonets, including the southern shores of Lake Onega, Lake Lacha, and the banks of the river Onega near Kargopol. It was here that he found remains which should help to decide one of the most important questions connected with pre-historic man, viz. what animals were met with here by man and served him as a means of subsistence. Data were also forthcoming for a comparison with the Scandinavian stone remains.

Interesting particulars are also given with reference to Lake Lacha and other great lakes of this northern region. Some are of great depth and studded with numerous islands, such as Lake Vyg; others again are shallow and have sandbanks. The present inhabitants, their industries and habits of life, are also described.—**[E. D. M.]**

Sadovnikof, D. N.—Skazki i predaniya Samarskago kraya. Sayings and traditions of the Samara country; forming vol. xii. of the Zapiski (Memoirs) of the Ethnographical Section of the Russian Geographical Society. St. Petersburg, 1884, pp. vi. & 388.

In a preface M. Maikof announces the decease of the talented collector of this folklore before the publication of his work. There are altogether 184 tales, the larger number having a more than local interest; such for instance are those on Ilya of Murom, the rebels Stenko Razin and Pugachof, and Peter the Great. They were taken down from peasants and burghers on both banks of the Lower Volga in the governments of Samara and Simbirsk.—**[E. D. M.]**

ASIA.

Balfour, [Surgeon-General] Edward.—The Cyclopædia of India and of Eastern and Southern Asia, Commercial, Industrial, and Scientific; products of the Mineral, Vegetable, and Animal Kingdoms, useful Arts and Manufactures. Three volumes. Third edition. London, Quaritch, 1885: large 8vo., vol. i. pp. vi. and 1280; vol. ii. pp. 1128; vol. iii. pp. 1203. Price 5*l.* 5*s.*

The first edition of this useful work of reference was published in 1858, and the second in 1873, both in India. The present edition, enlarged to three volumes, is the result of seven years' preparation (1877–84), and has been published in England. This edition contains 35,000 articles, and 16,000 index headings, relating to an area of 11,722,708 square miles, peopled by 704,401,171 souls. The work embraces indeed, not only India, but practically all Asia; and we find articles on Australia, America, France, and a short one on England. It would certainly have rendered Dr. Balfour's labour lighter, and the work on the whole more convenient, had he confined it to India proper. The whole work of compilation has apparently been done by himself, and therefore we must not expect throughout the same precision as would have been looked for from specialists. About the general utility and trustworthiness of the work there can be no doubt; it reflects great credit on the industry, care, and wide knowledge of Dr. Balfour. There is scarcely any subject in any department embraced in the wide field which the Cyclopædia covers, upon which information is not afforded; and to the student in search of further information, the references appended to the various articles will be found useful. It includes, we may say, short biographies of such living men as are, or have been, connected with India. The article on India itself does not bulk large, 180 pages, but it contains much condensed information, and is provided with a minute special index. There are also detailed indices to the articles on British India, Birds, and Boats, besides a very minute general index of 65 pages of three columns each.

AFRICA.

Brackenbury, [Major-General] Henry.—The River Column: a Narrative of the Advance of the River Column of the Nile Expeditionary Force, and its Return down the Rapids. With maps by Major the Hon. F. L. L. Colborne. Edinburgh and London, W. Blackwood & Sons, 1885: crown 8vo., pp. viii. and 291. Price 7*s.* 6*d.*

The River Column, under the command of General Earle, formed that portion of the Nile Expedition which, on leaving Korti, was to follow the course of the river, avenge the murder of Colonel Stewart, and ultimately co-operate with the Desert Column in an attack on the Mahdi before Khartoum.

The author, who on the death of General Earle assumed the command of the column, gives a detailed narrative of the events during the ascent of the Nile from Korti to within 26 miles of Abu Hamed, including the action of Kirbekan on the 10th of February, and the manner in which the Monassir tribe were punished for the murder of Colonel Stewart, and of the return to Korti. The maps illustrating the volume are:—1. Sketch of ground at Kirbekan (scale about 6 inches = 1 mile); 2. Sketch of river Nile at Hebbeh (scale ditto); 3. Sketch of river Nile from Merawi to Huella (scale 4 miles to an inch).

AMERICA.

[America, United States.]—[Tenth Census of the United States, 1880.] Vol. XI. Report on the Mortality and Vital Statistics of the United States as returned at the Tenth Census (June 1st, 1880), by John S. Billings, Surgeon United States Army. Part I.—Vol. XIII. Statistics and Technology of the Precious Metals. Prepared under the direction of Clarence King, Special Agent, by S. F. Emmons and G. F. Becker. Washington, Government Printing Office, 1885: 4to., plates, pp. (Vol. XI.) lxiii. and 767; (Vol. XIII.) xiv. and 541.

The contents of Vol. XIII. are as follows:—Letter of transmittal. Introductory remarks. Preface. Chapter I.—Geographical sketch of the states and territories of the Pacific division. II.—Geological sketch of the states and territories of the Rocky Mountain division. III.—Deep mines. IV.—Placer mines and mining ditches. V.—Amalgamating mills. VI.—Smelting works. VII.—Bullion production. VIII.—Mints. Appendix I.—Mining industries of Utah. II.—Schedules. III.—Directory of mines and works. Index.

[Columbus.]—Christophe Colomb, son origine, sa vie et ses voyages, sa famille et ses descendants. Études d'histoire critique, par Henry Harrisse. Tome second. Paris, Ernest Leroux, 1884: large 8vo., pp. 605, frontispiece, coloured plate, and genealogical tables. Price 21*s.* (*Williams & Norgate.*)

The first volume of this work was noticed in the 'Proceedings,' vol. vi., 1884, p. 426. In the present volume, one chapter, 134 pages, is devoted to a narrative of the four voyages of the great discoverer, in each case a document as nearly contemporary with the voyage as available being appended. After a chapter on the death of Columbus, his wills, his personality, his heirlooms, and other points, the remainder of the text of the volume is devoted to his descendants in their various ramifications. Here M. Harrisse has collected much very curious information. To his own satisfaction—and he seems to have exercised a fair amount of caution in his researches—he traces the blood of the humbly born Italian into some of the most illustrious families of Europe—the Alvas and the Berwicks—thereby connecting Columbus in no remote way with England. M. Harrisse states that there still exist in Madrid a certain number of the descendants of Columbus. The appendices (pp. 400–556) contain material which will be valuable to future investigators, among others, various old notarial acts of Genoa and Savoy; the wills of Columbus; what is supposed to be a hitherto unpublished memorial by Columbus on the means necessary for the conquest of the Indies (without date). There is a very full index to the two volumes.

Wyse (Lucien N. B.).—Le Canal de Panama. Paris, Hachette et Cie.: large 8vo., pp. 400, two large maps, 90 illustrations. Price 20 francs. [Presented by the author.]

This handsome work is historical and descriptive; not critical, like the brochure of Mr. Rodrigues, noticed in a recent part of the 'Proceedings.' M. Wyse has been connected with the great undertaking of M. de Lesseps almost since the beginning, and is familiar with all its stages and aspects. He has brought together in the present volume, in systematic form, much information which will render it useful as a book of reference. The first two parts of the work especially abound with useful geographical information. Having commanded the expeditions which investigated the best route for the canal, M. Wyse knows every foot of the ground, and has a genuine enthusiasm for the wonders of tropical nature. It was M. Wyse who obtained from the Colombian Government the definite concession required for the construction of the canal. It was he also who, in concert with his colleague Lieutenant Reclus, presented the plan adopted by the Congress of 1879, which is now being carried out. Whatever may be thought of the commercial value of M. de Lesseps' great enterprise, it has in this and other works contributed to advance geographical knowledge. M. Wyse's work is divided into five parts:—I. General view of the Colombian Isthmus. II. Sketch of all the explorations which have been made. III. Comparative study of the various routes proposed for the junction of the Atlantic and Pacific. IV. History of the political and private negociations relative to the American Isthmus. V. Account of the state of the works in Panama, and position of the Interoceanic Canal Company. Appended are various treaties and documents, with a list of geological specimens of the Colombian Isthmus. There is a large map of the Colombian Isthmus, 1:500,000, with inset of the United States of Colombia and Central America, and a panoramic view of the canal on the scale 1:100,000. The many illustrations are beautifully executed.

The following works have also been added to the Library:—

Douglas, Robert K.—China. London, Society for Promoting Christian Knowledge; New York, E. & J. B. Young & Co., 1882: 8vo., map and illustrations, pp. 400. Price 5*s*.

Anderson, Richard.—Lightning Conductors: their History, Nature, and Mode of Application. Third edition, revised, rearranged, and enlarged. London, E. & F. N. Spon, 1885: 8vo., illustrations, pp. xv. and 470. [Presented by the author.]

Cora, Guido.—Cenni generali intorno ad un Viaggia nella Bassa Albania (Epiro) ed a Tripoli di Barberia compiuto dal Settembre 1874 al Gennaio 1875 da Guido Cora. Torino, Istituto Geografico Guido Cora, 1875: 4to., map, pp. x. and 12. [Presented by the author.]

['Corwin,' Cruise of the.]—Cruise of the Revenue steamer *Corwin* in Alaska and the North-west Arctic Ocean in 1881. Notes and Memoranda: Medical and Anthropological; Botanical; Ornithological. Washington, Government Printing Office, 1883: 4to., plates, pp. 120. [Presented by the Secretary of the United States Treasury.]

Vedova, G. Dalla.—Pellegrino Matteucci ed il suo Diario inedito (con carta). Roma, Presso la Società Geografica Italiana, 1885: 8vo., pp. 35. [Presented by the author.]

Guzman, Ruiz Diaz.—Historia de las Provincias del rio de la Plata. [MS.] 1612: map, folio.

Viedma, Don Francisco de.—Informe general de la Provincia de Sta. Cruz, de la Sierra, cuya capital es la Ciudad de Cochabamba. Comprehend la Descripcion Geografica de toda ella con sus verdaderas latitudes, y longitudes, frutos, y Comercios, demostrando su estado en la Balanza del interno y externo, asi entre

la misma Provincia, como en las de este Reyno, y los de España, y se proponen los medios mas adaptados à su prosperidad, conciliando el libre Comercio con las Misiones de Moxos y Chiq^{tos} Lo dirige el Gobernador Intendente de ella Don Francisco de Viedma al Exmo Señor Virrey del Distrito en virtud de su Superior Orden de 13 de Octubre de 1787. [MS.] 1793: folio.

Guevara, [Father].—The History of Paraguay, the Rio de la Plata, and Tucuman. (An abridged translation from the inedited MS.) [MS.] Folio.

Alvear, Don Diego.—1. Historical and Geographical Account of the Province of Misiones (Paraguay) by Don Diego Alvear, one of the Spanish Boundary Commissioners. [MS. in Spanish.] 2. Description of various Provinces and Districts, chiefly in Upper Peru, under the Vice Roy of Buenos Aires. 1780. [MS. in Spanish.] 3. Account of the Population of the several Provinces of Chili and their Productions. [MS. in Spanish.] Folio.

Villarino, Don Basilio.—No. 1. Don Basilio Villarino's Survey and Diary of his Exploration of the great River Negro in Patagonia to its Sources in the Cordillera of the Andes. 1782. [MS. in Spanish.] Map.—No. 2. Diary of his Voyage from The Rio Negro to examine the Coasts, the Bay of All Saints, the Isles of Buen Succeso, and to verify the Mouth of the Rio Colorado, and to ascend it. 1787. (The original paper.) [MS. in Spanish]. Folio.

Cruz, Don Luis de la.—Viaje de D. L. de la Cruz por los Indios desde Chile à Buenos Ayres. A.D. 1806. [MS.] Folio, map.

[The above six MSS. are from the library of the late Sir Woodbine Parish.]

[Murray, John.]—A Handbook for Travellers in Gloucestershire, Worcestershire, and Herefordshire. Third edition, revised. London, John Murray, 1884: post 8vo., map and plans, pp. xxxix. and 350. Price 9*s*.

——— Ditto in Sussex. Fourth edition. London, ditto, 1877: post 8vo., map and plan, pp. xxiii. and 151. Price 6*s*.

——— Ditto in North Wales. Fifth edition, revised. London, ditto, 1885: post 8vo., maps and plan, pp. xlii. and 190. Price 7*s*.

——— Ditto in South Germany and Austria, being a Guide to Würtemberg, Bavaria, Austria, Tyrol, Salzburg, Styria, etc., the Austrian and Bavarian Alps, and the Danube from Ulm to the Black Sea. Fourteenth edition. With a Supplement. London, ditto, 1881: post 8vo., maps and plans, pp. xxiv., 4, and 636. Price 10*s*.

——— Ditto in Southern Italy; comprising the description of Naples and its environs, Pompeii, Herculaneum, Vesuvius, Sorrento, the islands Capri, &c.; Amalfi, Pæstum, Pozzuoli, Capua, Taranto, Bari; Brindisi, and the roads from Rome to Naples. Eighth edition, revised and corrected. London, ditto, 1883: post 8vo., maps and plans, pp. xlvii., 2, and 448. Price 10*s*.

——— Ditto in Sweden. Stockholm and its vicinity. The Gotha Canal; Falls of Trollhättan; Lakes Wenern, Wettern, Mälaren, etc.; Upsala; Dalecarlia; Islands and Shores of the Baltic. Sixth edition, revised. London, ditto, 1883; post 8vo., maps and plan, pp. xii. and 160. Price 6*s*.

——— A Handbook of Rome and its Environs. Thirteenth edition, carefully revised on the spot. London, ditto, 1881: post 8vo., maps and plans, pp. xii. and 629. Price 10*s*.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

ARCTIC.

Greenland.—Skizze von König Christian IX-Land, aufgenommen von G. F. Holm, 1884 u. 85. Scale 1 : 1,140,000 or 15·6 geographical miles to an inch. Nebenkarten: Übersichtsskizze von Grönland 1 : 14,000,000. Kjellströms Aufnahme des König Oskar-Hafens 1 : 200,000. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 3. Justes Perthes, Gotha. (*Dulau.*)

EUROPE.

Deutschen Reich.—Neueste Karte vom ——, der Oesterreichisch-Ungarischen Monarchie, der Schweiz, den Niederlanden, Belgien, Rumanien. Nebst Theilen der angrenzenden Laender, von C. F. Bauer und E. Serth. Scale 1 : 1,250,000 or 17·1 geographical miles to an inch. 6 Blätt. Stuttgart, Maier. Price 8*s.* (*Dulau.*)

Europa.—Wandkarte von ——, von Carl Bamberg. Scale 1 : 3,300,000 or 45·2 geographical miles to an inch. Berlin, Chun. Price 16*s.* (*Dulau.*)

France.—Carte géologique générale de la —— à l'échelle de 1 : 500,000 or 6·8 geographical miles to an inch, par G. Vasseur et L. Carez, dressé sur la Carte du Dépôt des Fortifications. 48 sheets. Price 8*l.* (*Dulau.*)

Of this map, eighteen sheets are published, the remainder is in course of preparation, and when complete, an explanatory text will be furnished gratis to subscribers.

——— Carte de ——, dressé par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Paris, 1885. Sheets: VII.—18, Questembert; IX.—19, Ancenis; IX.—26, Côte d'Arvert; XV.—18, Blois (Est); XVI.—17, Orléans; XVI.—21, Issoudun; XVI.—22, la Châtre; XVIII.—19, Cosne; XXV.—26, Albertville; XXV.—27, St. Jean-de-Maurienne; XXVI.—26, Ste. Foy; XXVI.—27, Lanslebourg. Price 7*d.* each sheet. (*Dulau.*)

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81	Mersa Durúr to Trinkitat	New chart, Mersa Durúr to Trinkitat	81
933	Rangoon river approaches	New plan, Rangoon river and approaches	933
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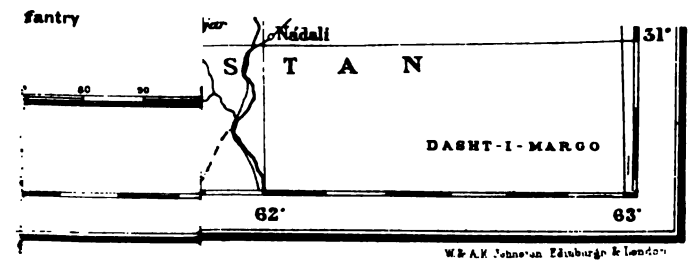
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The Hill-slopes of Tong-king. By J. George Scott.

(Read at the Evening Meeting, January 18th, 1886.)

Map, p. 288.

Tong-king is a good deal better known now than it was three years ago. There was then very little to be ascertained about it beyond the simple facts that it was the northern portion of the ancient kingdom of Annam, or Cochin-China; that it lay along the western shores of the gulf that bears its name; that its northern boundaries were the Chinese provinces of Kwang-tung, Kwang-si, and Yunnan; those on the west, the north-eastern districts of Siam and of the states supposed to be tributary to Burma, generally known as the Laos States; while to the south it met the kingdom of Annam, to which it was annexed in 1802. If to this is added that Hanoi (or Ke-cho, as it was usually called) was the capital, that the Song-coi was the great river of the country, and that Robinson Crusoe careened his ship there, and met with such an inhospitable reception that his boatswain had to pour boiling pitch on the natives before they would let him alone, probably the general items of knowledge of the country would be exhausted.

There is a very great deal more known now; but before proceeding to speak of the northern or hilly part of Tong-king it may be well to give a slight general sketch. Existing maps of Tong-king are without exception very bad. There is now no excuse for an inaccurate map of at least the delta of the Song-coi, or Red River, as it is commonly called, but there is every reason to believe that the whole of the north is most inaccurately laid down. The details are taken from native sources. Annamese charts are good enough for the names of places, for these are carefully noted for revenue purposes; but beyond that all is doubtful. The circle, or square, or rectangle that signifies a village, a town, a fortress on a native map, occupies according to scale a matter of 20 square miles, and the name takes up about 30 more. This gives some initial latitude, and when the native cartographer cannot finish off his mountains—well, he shunts the towns in deference to artistic

principles. The mountains themselves are represented in profile, instead of as from a bird's-eye view. It is not, therefore, pretended that the accompanying map is to be trusted north of a rough line drawn from Lang-son, through Thai-nguyen to Tuyen-kwan and the Red River. The course of the Song-coi is, however, accurately determined by the charts of M. Dupuis and the Comte de Kergaradec.

Tong-king lies between the 18th and 23rd degrees of north latitude and the 104 and 106th of east longitude, and contains a superficial area of between 60,000 and 70,000 square miles, with a population of probably twelve millions. The frontier line is very uncertain everywhere except on the south, where its importance from a political point of view is the least.

Physically the country may be divided into three distinct portions:—1. The delta land. 2. The region of plateaux. 3. The forest region.

The delta country forms roughly an isosceles triangle, of which the base is on the sea between Kwang-yen and the Cua Dai below Ninh-binh and the two sides the Song-cau and the Dai river. Son-tay forms the apex, and not far below this town the Song-coi (or Thao of the Annamese, the Hoang-kiang of China) opens out at intervals into four great branches, each of which has its own outlet and receives all the minor streams, whether from the Chinese or the Laos side. These four mouths are known as the Cua Cam, Cua Thai-binh, Cua Ba-lacht-dong, and the Cua Dai, and each of them has a number of minor outlets. The Cua Cam is the only one hitherto used for trade purposes, but it seems probable that the Cua Dai will shortly be made use of for deep-sea ships. These main waterways are connected together by a network of subsidiary channels, many natural, some to a certain extent artificial, such as the Song-chi, the Bac-ninh canal, or the *Canal des Rapides* as the French call it, and the Thai-binh canal. The delta provinces are Hai-dzuong, Bac-ninh, Son-tay, Hanoi, Hung-yen, Nam-dinh, and Ninh-binh.

The plateaux, or upland region, rises steadily up to the north from the Song-coi and Song-cau rivers, at first in mere undulating ground, merging into grassy hills, with occasional jungle in the valleys, until at last the pine-clad mountains are reached. The highest summits are between Dong-sung and Thanh-moi, near the boundary of the Bac-ninh and Lang-son provinces. The whole prospect is a mass of hills extending away to the horizon, no very prominent peaks anywhere, but rounded grassy hills going on for ever. These upland provinces are Kwang-yen, Lang-son, Cao-banh, Thai-nguyen, and Tuyen-kwan.

The forest region extends west of the 105th parallel, and is co-extensive with the Hung-hoa province. Very little is known of this part of Tong-king beyond the banks of the Song-coi. The natives represent it as inhabited only by a few scattered savage tribes, fugitive Chinamen (known as Black or Yellow Flags), and wild beasts.

In the south there are three other provinces, small and narrow, from

the pushing in of the Laos States. These three—Thanh-hoa, Nghe-anh, and Ha-tinh—are hilly, and have physically more resemblance to the Annam provinces than to Tong-king. They are cut through by numerous short rivers running down from the main Annam range.

The Song-coi dominates the whole river system of Tong-king, flowing, as it does, from north-west to south-east across the whole country. It rises near Tali-fu in Yunnan from a chain of hills which forms the watershed between it and the Mekong basin, and enters Tong-king at Lao-kai. Though a noble-looking river, it is not navigable for craft of any size. Boats drawing over 15 feet cannot ascend to Haiphong, on account of a bar across the mouth of the Cua Cam. Beyond Haiphong six feet is the absolute limit of draught for vessels proceeding to Hanoi during six months of the year, and with this draught they are constantly getting aground. Beyond Hanoi the depth decreases. The long narrow native boats which used to be employed on the trade with Lao-kai carried at the most 20 tons, and drew when loaded little over two feet of water. Even junks of this class would not get beyond Lao-kai, and had difficulty enough in getting there. In February, March and April there is not water enough for them. In July, August, and September they cannot stem the floods. It is therefore pretty evident that as a means of reaching the fabled wealthy province of Yunnan the Song-coi is a delusion. From Hanoi downwards it averages 1000 yards wide. At Hung-hoa it measures about 500, and so goes on decreasing till at Lao-kai it measures 100 yards. Moreover, the upper waters are rendered difficult at all times by rapids, places where the channel is narrowed by outcroppings of rock, or by spits of sand, so that the current runs swifter.

From June until September the usual route from Haiphong to Hanoi is by the Song Kinh-thai and the Song-chi, or Bac-ninh canal. During the dry season, however, the Rapids canal is impossible, and the route then taken is by the Song Tam-bac, a narrow but deep canal along the banks of which part of Haiphong is built. The passage is rendered tedious and difficult for navigation by the extraordinary winding of its course, showing plainly enough that if anything was done by the hand of man to form the canal, nature must have done a good deal beforehand. From the Song Tam-bac vessels pass into the Lac-tray, one of the mouths by which the united Song-coi and Thai-binh waters flow into the sea. Another canal, that called the Thai-binh, leads from this into the main river, near the large village of "the Bamboos." This route, which has to be used during the greater part of the year, is fully 25 miles longer than that by the Song-chi canal.

On the right bank there is only one considerable affluent, the He-ho, or Black river. It joins the Song-coi a few miles below Hung-hoa, and at its mouth is considerably broader than the so-called main stream. But the Tongkinese, like the Chinese, judge of the importance of a

river, not by its size, but by the amount of traffic which goes on upon it. Trade upon the Black river is utterly spoilt by a huge cataract, some 35 miles from its mouth, just at the bend to the north. The He-ho comes from Yunnan, and is believed to be the Papien river; but there is really very little known about its upper waters. A French gentleman who claimed to have ascended it into China, and published a most elaborate chart with villages and rapids clearly marked at frequent intervals, did not meet with any very enthusiastic belief in his explorations. He has since been convicted of coining money in Haiphong, so that there seems to be some ground for scepticism.

The chief tributary on the left is the Tsin-ho, the Rivière Claire of the French. It enters a few miles below the He-ho. On its banks stands Tuyen-kwan, and the river is navigable for small craft some distance higher. The Tsin-ho flows past Kai-hoa in south-east Yunnan, and seems to rise in a small lake to the north-west of that town. On leaving the Chinese province it flows some distance underground with a heavy fall. Unlike the other rivers of Tong-king, its waters are clear and limpid and are stocked with very fine fish. Villages become scarce at a short distance from the embouchure, but the upper river, like the He-ho, is said to pass through a rich mineral country.

In central Tong-king there is another river basin, that of the three streams, the Song-cau passing about three miles north of Bac-ninh, and flowing under the walls of Thai-nguyen, the Thuong-giang rising in the hills near Cut on the Lang-son road, and the Loch-nam crossing from the east and rising a little beyond Chu. They join almost at the same point to form the Thai-binh, which is connected by so many cross channels with the Song-coi, as to fall into the sea by practically the same mouths. All these three rivers are navigable for small launches for distances of from 20 to 30 miles, and flow through a highly cultivated country.

A third river basin, to the extreme east, is that of the Lang-moon, a branch of the Ngan-nan-kiang, a Chinese river which enters the Tong-king Gulf east of Lien-chao in Kwang-tung province. M. Romanet du Caillaud speaks of a river which he calls the Song-tam, and represents as a branch of the Lang-moon, but this is probably an error. The Lang-moon seems to receive all the drainage of the Lang-son and Cao-banh provinces, and it is not improbable that the Song-ki-kung, the river which flows northwards past Lang-son, is really the upper Lang-moon.

In the southern province there are two rivers, the Song-ma in Thanh-hoa, and the Song-ka in Nghe-an. It is so short a distance here from the hills to the sea that they have a very swift current, and are of no great size. Canals join the two rivers, and boats can pass from one to the other parallel to the sea, a circumstance which reminds one of Annam, as, indeed, the flat reaches of sand and the rolling sand dunes,

cooped in by the wall-like range of hills covered with impenetrable forest, continually suggest the idea that it is only accident that has allotted these provinces to Tong-king.

There are few lakes in Tong-king. The large sheet of water north of Hanoi is very shallow, and the same seems to be true of the only others of importance, known as the Ba-be, the "three-seas," near Cao-banh. During the rains it would appear that the three unite into one, with an island in the centre, which served in 1879 as a last place of refuge for the remains of Li Yung-choi's rebel army. In the dry season channels unite the three sheets, and a large portion of what a few months before was water is transformed into rice-fields. The surrounding country, from the report of Father Fuentes, a Spanish missionary, the only European who is known to have penetrated thither, would appear to be exceeding fertile. At least two rivers, according to native report, take their rise in the Ba-be and flow north and north-east.

The whole of the delta lands are cut up and covered by channels and embankments, or dykes. No nation surpasses the Tongkinese in ditching and delving, and very many of the communications are undoubtedly their work. The Song-chi canal is the most recent, as well as the most important. It dates back no farther than thirty years. Other so-called canals, such as that of "The Bamboos" (the Thai-binh) are equally incontestably—in their first origin, at any rate—the work of exceptional floods, bursting through an embankment to make new outlets for the mass of water. The immense rise of the river, beginning in May and ending in October, is as much due to the melting of snow in the northern hills as to the torrent rains.

The Tongkinese are wonderfully skilful in the construction of embankments. These dykes built to guard the flat country against the floods of the rainy season are the most remarkable works in the country. They are frequently 60 or 70 feet wide at the base, and from 20 to 30 feet high, and are built in regular series to protect three or four villages, the next series of course joining on, so as to make a continuous system. On the top of the larger dykes three carriages might be driven abreast. There are hundreds of miles of them in the delta, and they cover the whole country up to the Song-cau river, and to beyond Hung-hoa. They are practically the only roads, certainly the only roads that are practicable during the rains, and scores of villages find protection on their slopes. They are admirably constructed, so as to turn rather than check the force of the water. To hold the soil firm, each embankment is built over a regular frame-work of bamboos, horizontal and at the angle of the slope, all being firmly lashed together with rattan, and fastened to posts driven into the ground. As a national work they are far more astonishing, in the patient labour they imply, and infinitely more useful, than the famous wall of China, or even the Grand Canal itself, concerning which Mr. Colborne Baber speaks in such slighting terms.

These embankments serve as the roads, but they are often so grown over with trees and bushes that nothing is left but a mere foot-track, while here and there a joss-house, or the tomb of some great man covers the whole of the ridge and necessitates scrambling along the slope. There are practically only two roads, as distinguished from places where you can walk, in the delta. These are: the Mandarin route, the great road which runs from Saigon, through Hue, to Hanoi, and then, by way of Bac-ninh and Lang-son, to China; and the northern road, from Hanoi to Son-tay and Hung-hoa. These have been greatly improved, under French instructions, by the villagers along the line, but they are still unmetalled, and, indeed, little better than places where the grass has been trodden away.

Tides are felt all over the delta, and even in the Song-cau river, where there is occasionally a rise of three feet in spring tides. The water is brackish five miles above Hanoi, but beyond this point it is more of a simple swelling or backing up of the river than a regular tide. The tides are diurnal—that is to say, there is but one high and one low tide during the day, a fact worth noticing.

The extraordinary fertility of the delta lands is undoubtedly due to the river and to the industry with which the inhabitants have prevented the river from becoming the master. The soil is nearly pure clay, with hardly any traces of natural mould; and were it not for the copious alluvial deposits we should not hear of the two harvests a year, for which Tong-king has become so famous. On the other hand, were it not for the miles of elaborately constructed dykes, the delta would be no better than the conglomeration of channels and branches of the river, bottomless swamps, great tracts of reeds and flags, dense forests, and impenetrable scrub jungles, which make up the Dobrudscha, or the dismal mangrove swamps of the Malay peninsula.

The immense quantity of reddish soil which the Song-coi brings down all the year round is rapidly extending the delta. When Hanoi was built by the Chinese in the eighth century of our era, it was a sea-port; now it is a hundred miles inland. Two centuries ago the Dutch and Portuguese factories at Hung-yen were close to the sea; now the town is quite thirty miles from the coast. Missionaries still living speak of villages which are now populous and agricultural on sites where a couple of decades ago the fisherman cast his nets. The isolated, jagged hills rising from the plain south of Dong-trieu, Elephant Mountain, Do-son, and numerous others, have all the appearance on their sides and bases of having been washed by sea-storms at no very remote time.

The principal staple of the country is rice, which, though of good quality, is inferior to what is exported from British Burma, both in character of grain and yield per acre. The other crops are pea-nuts, from which soap is made, the castor-oil plant, the mulberry for silk, cotton, sugar-cane, sweet-potatoes, taro, and a variety of tubers; and

from the northern provinces, lacquer oil, cu-nao, or false gambier, star-anis oil, used in perfumery, and a variety of medicinal plants for the Chinese market. Tobacco is grown, but it is unsatisfactory smoking, and the tea produced is equally insipid. The sericulture of Tong-king is still in its infancy, and is likely to develop enormously under skilled management. At present the cocoons are badly reeled off, and the threads are of unequal size, rendering the production of fine webs an impossibility. But this skilled Lyons agents ought very soon to remedy. There was a very fair amount of trade in Tong-king three or four years ago, but it has almost entirely disappeared during the troubles. The English cotton goods and yarns, the opium and Chinese medicines, which formed the chief imports, have for the present given place to the cargoes of tinned meats and the casks of Bordeaux for the French soldiery.

The principal towns of the delta are Hanoi, Nam-dinh, and Haiphong. Hanoi is not only the chief town in Tong-king, but it is the finest in Annam, and only second to Cholen, the Chinese town of Saigon, in all French Indo-China. Formerly the population was estimated at 150,000, but war's alarms and actual sacking reduced it for a time to an almost absolute desert. It has now regained a great deal of its former population, and will in a few years without doubt outstrip all other cities in the country. The French have widened and metalled many of the streets; there are street-lamps in almost all the thoroughfares, and a good many European shops have been built. Like all Tongkinese, and, indeed, Chinese towns, it consists of two parts, the commercial town and the citadel, or walled town. The citadel is a huge square of about a mile to the side, with high brick walls and bastions, surrounded by a moat. It encloses the palace of the Tong-doc, or provincial governor, the treasury, the court of justice, the royal pagoda, the prisons, barracks, public offices, and official residences. The commercial town extends along the river-face for a distance of quite a mile and a half, and then for a mile and a half inland to the citadel. The business part of the town, which is almost entirely Chinese, shows signs of considerable wealth. The streets are broad, and flagged with large stones in the usual Chinese style, and the houses are substantially built of bricks covered over with white chunam. The Annamese houses are much inferior, and altogether hideously dirty. Like all Easterns, they gather together in crafts; the embroiderers and silk workers in one street, the turners in another, and the coffin-makers in a third. But the Chinamen were the making of Hanoi, and until they are allowed to settle again without restriction it will not regain its old opulence.

The same may be said of Nam-dinh, the second town in Tong-king. The population used to be reckoned at 50,000, and it is probably not much less at the present time. Still, though it is only half the size of Hanoi, it does very nearly as much trade, the centre, as it is, of the most fertile part of the delta, and close to the chief silk-district of Ninh-binh.

There are several very fine black-marble paved streets in it, one at least running the entire length of the town, and superior to any in Hanoi.

Haiphong, at present the only port, is the most disappointing place in the country. Apart from the few trim white houses of the French concession along the Cua-cam, the whole place looks desolate and discouraging in the extreme. There are no wharves, no piers, no warehouses for goods, almost nothing but filthy Tongkinese hovels. The village, for it is little more, perhaps grows, though even this is open to dispute; but under no circumstances can it grow fast. It stands on ground flooded at high tide, and therefore building sites are only to be obtained by piling up earth brought in from the surrounding paddy-fields, and so obtaining a foundation. The very roads, or streets, if they can be so called, have to be constructed in this way, like the embankments of the country. It is only the brackish water which prevents Haiphong from being a simple grave. Every house is practically the centre of a cesspool, and it is astonishing that the cholera, now prevailing in Tong-king, did not break out before.

Kwang-yen, which lies about 10 miles north-east of Haiphong, on the Lac-huyen, has been a good deal talked of as a more suitable place for the Port of Tong-king. At Kwang-yen there are low hills to build on, there is good drinking water, and there is a foot more water than over the Haiphong bar. But as yet nothing has been done, for want of money and labour. The island of Hon-cac in Halong Bay is also talked of, and could receive the largest sea-going steamers.

Besides these towns there are no others of present importance in the delta. Hai-dzuong, with a population of about 40,000, was almost as wealthy as Nam-dinh, and had many streets of rich Chinese shops. But the French and the Chinese between them have blown up and burnt down the whole place, and nothing remains but the Spanish cathedral and the mud and bamboo wattled bothies of the Annamese.

Bac-ninh in the same way has been completely destroyed. The entire Chinese quarter to the north of the town has been cleared away for military purposes, and it is unlikely that much of a town will ever exist again. The emporium for the rich province will be Dap-cau, on the banks of the Song-cau river.

Son-tay, in the same way, was destroyed by the French. It has more chance of revival, being on the river, and with a highly-cultivated country round about. The same may be said of Hung-hoa, which was burnt by the Chinese when they were shelled out of it in 1884.

Ninh-binh is another important agricultural centre, and is very picturesque, with its fort-crowned rock springing up out of the citadel. But the town, as distinct from the citadel, is of no great size. Indeed, apart from Hanoi, Nam-dinh, and formerly Hai-dzuong, it is characteristic of Tong-king that the populous and commercial centres keep away from the citadels. People who wanted to prosper and be let alone

settled as far away from the officials, and especially from the soldiery, as they could. It was only the Chinamen who dared to grow fat and gather together pieces of silver in the neighbourhood of the mandarins. Thus it happens that the pottery village of Cho-ha, a few miles north of Bac-ninh, on the river Song-cau, was very much more thriving and substantial than the provincial town, and the large village of Dang-sa, a little farther off to the south, on the other side of the Song-chi canal, was equally beyond question more populous and well-to-do. The "Village of the Bamboos" is lively and brisk in its trade. The adjacent citadel of Hung-yen is a wretched dead-and-alive place. My-luong was a far better built place than Son-tay, Ninh-binh is nothing beside Yen-hoa.

From its proximity to the temperate zone the climate of Tong-king is on the whole excellent. In the interior there are unpleasant cold mists in the months of February and March, and the heats in June and July are sometimes almost intolerable, on account of the moisture in the air. But on the whole there is no great cause for complaint. During the dry season—that is, for six months of the year, from September to April—the thermometer varies between 70° and 40° F. During the hot and rainy six months it is exceptional to have the thermometer over 100°, and 70° is the minimum. On the whole the country is healthy, notwithstanding the abundance of standing water, no doubt because this water lies in paddy-fields rather than in marshes. There is a certain amount of fever, but it is seldom of a dangerous type; and the dysentery from which several of the Tong-king garrisons have suffered has been brought on by the imprudence of the soldiers, or by forced expeditions after marauding bands when the whole country was in flood.

This brief sketch will give some idea of the Tong-king delta, and we will now proceed to consider the hill-country. The merest outskirts of this are as yet occupied, and it is impossible to describe more than the line of the expeditions of the French troops and the country traversed by the various reconnaissances, most of which I was privileged to accompany. As already said, the hill-country commences north of the river Song-cau and the line which it roughly suggests across Tong-king. The difference between the country to the south and the north is very striking. Southwards to the very horizon, stretches a vast plain of flat cultivated land, only broken by the few hills east of Bac-ninh and the bamboo-tufted villages. To the north, from the very banks of the river almost, the country rises up into gently rounded grassy hills, splendid pasturage ground, and already so used. Even here the population seems thinner. There is an occasional homestead on the hill slopes, or a hamlet of half-a-dozen houses or so, but the majority of the people seem to prefer the south bank.

We will cross the river and proceed first in a north-westerly direction towards Thai-nguyen. Almost immediately the first tracts of terrace

cultivation are reached. In the low grounds are the wet paddy-fields; a step up come various tubers and pea-nuts, then sugar-cane, castor-oil, maize, and even the Chinese cassia, a species of cinnamon. The neighbourhood of the temperate zone is marked by a few pine-trees scattered about in twos and threes on the low hill crests. A few miles of rolling sandy hills lead to a wide valley, wet and rice growing. On the edge of this is the village of Uong-van, a very large, straggling place. It is notable as the only spot as yet found in Tong-king where iron is worked. There was a crude kind of smelting furnace in the centre of the village, and a small quantity of very rich ore, but where this ore came from has not yet been discovered. It must have been from some distance, for the country, though steadily rising, is little more than a plain with low rolling hills, and there is no hint of a mine.

The villages are now well shaded with huge hard-wood trees, and the joss-houses and tu-vans, or spirit temples, are marked by huge banians. The road, a mere foot track, crossing occasional mountain streams, by solid, if rough, wooden bridges, keeps away from the hills, but these rise higher and more numerous, most of them quite bare, except for a round cap of pine-trees on the top, surrounding a shrine to the genius of the hills. Although there are considerable stretches of fallow land, and the hills are without exception uncultivated, the country in the neighbourhood of Yen-te (or Tinh-dao, as it is locally called), and northwards to Phu-binh, is industriously tilled, especially round the villages, which are far from few in number, though nothing like so crowded as they are in the delta. The villages themselves are even more strongly barricaded than south of the Song-cau, and are substantially built of brick, a material hardly ever used, except for religious buildings, in the low country. In this we already see traces of the Chinaman, who always takes care to have a solid house over his head.

The slight amount of confidence which the Annamese have in the world generally, and in their immediate neighbours in particular, was here very remarkably shown. As in the delta every village was fortified against all others, many of them so strongly that it would require artillery to bring them to terms, supposing the villagers to be armed with rifles. Even artillery would find it no easy matter to make a breach in the solid mud wall, and the close fence of live bamboo, growing both on the outer and inner slopes. But the Tongkinese are not satisfied with protecting themselves against outsiders. They very seldom allow the public pathways to pass so much as under their fence, certainly never through the village. They have much too low an opinion of wayfarer's honesty for that. But they go considerably beyond this in their suspicions. Every one who has anything worth guarding shuts himself off just as carefully from his fellow villagers, usually by means of a bamboo fence, often with a brick wall and an iron-clamped door, not uncommonly with both fence and wall. His

house and offices surround a square court on three sides in horse-shoe fashion, and there is usually a water-tank on the fourth side, with little islets of a floating species of watercress, anchored inside bamboo frames, themselves floating about. Thus he is quite compact and self-dependent, with his edible dogs and his pigs and ducks and fowls, and his buffalo, if he is a rich man; and he does not let anyone in unless he is quite sure he can turn him out again if it should prove necessary. Trong, a large village near Yen-te, was a remarkable example of strength in this way. It was ransacked by the French for treasure which the Chinese were supposed to have concealed there, but which was not found. There was no opposition beyond a lot of tum-tumming and shrieking on the part of the inhabitants; but if there had been, the position might have been held for hours after the outer works were breached. The passages from house to house wound about in bewildering fashion and were the merest lanes with thick bamboo and cactus fences on either side, and huge logs of timber in between. Every house presented a solid blank wall all round the square, and the gate was that of a prison, heavy brick side posts and two-inch-thick iron-studded planking. One or two of the houses were even crenelated. The village extended over an area of many hundred acres, and was built on a slope, where the upper houses could have poured down an indiscriminate fire all the time, and this was only one example of many in this part of the country.

Near Phu-binh, the Song-cau is a remarkably pretty river, flowing between high banks in picturesque wooded reaches that remind one a good deal of the Tamar, while here and there, where the banks are lower, it spreads out a good deal, and flows merrily over a pebbly bottom and as clear as crystal, a welcome change from the muddy waters of the delta.

The country between Phu-binh and Thai-nguyen is bleak in the extreme. The villages here keep mostly to the banks of the Song-cau, and the road goes up and down cheerless hill sides, covered with bracken and elephant grass and cut up by numerous hill streams, some of which are bridged, and some you have to wade through. Thai-nguyen lies at the top of a kind of bay made by the low hill country into the forest-clad mountains. The rolling hummocks cease about a mile to the southward, and from the last slope of the out-spurs there is a fine view across the uneven grassy plain. The town is shaded by fine hard-wood trees, out of which peep the *mirador*, or watch-tower, and parts of the official and religious buildings; and to the north, on the other side of the Song-cau, rises an abrupt, jagged limestone peak, with trees clinging where they can to its rocky sides.

The plain round about is well cultivated, and large quantities of timber are floated down the Song-cau to Bac-ninh and elsewhere. The mountains close at hand are said to be full of mineral wealth—and that

there are minerals seems to be certain from the wealth of the town; but the country is far too unsettled as yet for exploring parties, and none of the natives have been confiding enough to volunteer statements as to where the mines are. As a place of residence Thai-nguyen is the most charming neighbourhood I know in Tong-king. The river is extensively picturesque, and is stocked with fine fish. Game is abundant. There are partridges and francolin in the plains, as well as a small species of deer not unlike blackbuck, and the hills are full of large game of every kind, from sambhur to tigers and bears. The water is said to be bad, so full of mineral salts as to be dangerous; but it is more probable that the sickness prevalent in the Thai-nguyen garrison is due to drinking too freely in the hot weather of the water as it comes icy cold out of the hills.

There is a path, said to be extremely bad, over the hills from Thai-nguyen straight north to Cao-banh, and another which leads westward to Tuyen-kwan; but neither of them have been explored and are only known from native sources, and when the Tongkinese call a road bad it must be vile. The Black Flags have detachments in many of these hill-villages, and it is to be feared that it will be some time before the French have settled with these outlaws; so that we cannot hope to have any great details about the country hereabouts for some time.

At Thai-nguyen I had only reached the edge of the real hill-country. A year later, with the Lang-son column, I was able to penetrate through the hills right up to the Chinese frontier. This expedition will give a much clearer idea of the character of the northern Tong-king provinces.

There are two roads to Lang-son from the south; one the Mandarin route passing through Kep, Bac-le, and Thanh-moi, the other from Chu through Dong-sung and Pho-vy. We will follow the Chu road first, because it was by that way that Lang-son was taken, and because it had been previously unknown to Europeans. But we may as well have a glance at the country up to Kep and Chu before we start.

From our initial line of the Song-cau, the Mandarin route passes across the spit of land between that river and the Song-giang, crossing over each by a chain ferry. There are a few low hills on either side, but for the greater part of the 11 miles one passes through a very fertile plain country, without the embankments necessary for the safety of the delta provinces. From Phu-lang-thuong one starts on the regular Lang-son road. The road rises imperceptibly the whole way to Kep, which is about 10 miles off. Great part of the plain is entirely cultivated, but it is with pea-nuts, sweet potatoes, and castor-oil plants, that take more kindly to a dry soil than rice. Within a few miles of Kep, however, this ceases, and the path winds about between a series of low scrub and bracken-covered hummocks. There is very little water; the streams are not reached till beyond Kep, on the edge of the rough tangled mountain country to the north.

Lang-kep (that is, the village Kep) does not exist any more. The low hill, on which the little market-town stood, looking down on the oasis of rice-fields in the hollow, is now bare, except for a monument commemorating the French victory. Where in 1883 there was a thriving village, nestling in a cloud of bamboos and areca palms, there is now a naked red slope, a few charred beams, a tree or two, blasted with the flame that devoured all, houses and dead. But there is a strong fort commanding the outlet from the hills, and there are three canteens and the finger-posts pointing out the different cross-roads, and the general precision of the place make it the neatest post in Tong-king.

From Kep there is a cross-road to Chu, on the Upper Loch-nam river. One passes through the same sort of country, rolling hills covered with coarse grass or impenetrable scrub jungle, with every here and there a stretch of flat land, cultivated in the usual finished way of the Annamese. But the villages are few, for the hill-country immediately to the north has harboured for years a population that liked to live off its plodding neighbours in the lowlands.

Chu is not unlike Kep in position and general aspect. It is a mere military station, the troops camped on low hills, and a few shops down in the hollows. There is no hint of a native village anywhere near. Though Chu is on the Loch-nam, it can only be reached by small boats. Steam-launches and junks can get no farther than Lam, about four miles off, and about 20 miles up the river from its junction with the Song-giang. The banks of the Loch-nam are nothing like so cultivated or so populous as the Song-cau and the Song-giang. Villages are seen only every two or three miles, and for the greater part of the way tracking is impossible, on account of the jungle on its banks.

From Chu the road leads straight up to the hills, which here are simply larger examples of the hummocks round Kep and Chu, crowded close together. Sometimes there are bare ridges like the Yorkshire wolds, but mostly one finds rounded cupolas, like the *montagnes en ballon* of the Vosges, or rather a series of summits like haystacks with wide bases, clothed almost exclusively with a species of coarse elephant grass, two feet or so high and rather thin. Here and there a solitary tree served a little to relieve the monotony, but the trees were almost as bare of leaves as the hills were of everything but grass. The height gradually increased from five or six hundred feet to a thousand or fifteen hundred, with here and there summits rising to over two thousand.

There is a march of about 12 miles up a blind valley, and then a ridge about 900 feet high has to be crossed to get into the Dong-sung valley. On the southern side the villages are very few and small. Bamboos in some places do not seem to grow very freely, or the inhabitants prefer to have a clear view round about them. At any rate, most of the villages are only surrounded by a mud wall with *chevaux-de-frise* along the top, and the whole ground for about 20 feet all round

about outside planted with sharp-pointed bamboo stakes, so that they look like gigantic hedgehogs, and are not lightly to be approached in the dark.

On the other side of the ridge, when one gets into the Dong-sung defile, in the real mountain country, this is all changed. Whether it is that the villagers have nothing to steal, or that there is an understanding that all robbing has to be done outside of the hill-country, is not clear; but at any rate it is certain that the villages are as open as any hamlet in England, and stand very often on either side of the foot-path with no signs of defence about them. They are quite different in structure too. A flimsy bamboo shanty would not do for the cold, stormy hills; and accordingly we find the houses built of mud, beaten hard, or of conglomerate, with walls a couple or more feet thick and very small windows. The coarse grass of the hill sides is used for thatch. There are not, however, many villages to be seen, and they usually nestle into the ravine formed by two hills, some seven or eight houses, together with a little patch of paddy land in front of them, made to flourish by the irrigation obtained by damming up the little mountain rivulets. A few sweet potatoes and pea-nuts and some sugar-cane ordinarily complete their attempts at agriculture, though if there was more security the country could support a very much larger population.

The descent from the *col de* Deo-vang, the ridge just spoken of, is by a narrow gulch, winding round the base of the hills, and very different from the abrupt ascent on the Chu side. A fringe of bushes and trees marks the banks of the little stream that cuts deep down into the ground. When the real Dong-sung valley is reached it is very much wider, spreading out in places into a fairly wide plain, and seldom less than half a mile across, with little hills scattered about in it here and there, and trees growing in tropical thickness along the banks of the stream, which meanders down the middle and occasionally widens out into a morass. On either side are the hills rounded peak after peak from six hundred to a thousand feet high.

Dong-sung stands at the head of this valley. In itself it is nothing at all. There is a cumbrous wooden temple in a clump of pine-trees near the bank of the little river. This did not seem to have any name, but it looked suggestive of trout, and went off south-west to add its waters to the Song-giang. Close to the temple stood some fifteen or twenty mud huts in a double row, built on an open space close to the road. Dong-sung only gained notoriety by becoming the centre of the series of forts which the Chinamen constructed on the hill tops on both sides of the valley for a distance of seven or eight miles. What became of the original inhabitants does not appear, but from comparison with the other hamlets round about they would seem to have been Chinese or half Chinese, rather than Tongkinese.

Sheer up from Dong-sung rises a peak over 2000 feet high, overtopping a ridge 500 feet lower. From this summit one can see into the Bac-le (the mandarin) road. Indeed, the camp of Truong-khanh, or Thanh-moi, is directly west of Dong-sung, and only separated from it by this huge mass of Deo-kwao. The difference between the two valleys is very marked from the summit. On the Dong-sung side, as we have seen, the hills are bare and grassy; on the Thanh-moi side the valley is bounded to the west by a perpendicular wall of rock, of which I shall have more to say later on, and on the eastern side by forest-clad hills. Deo-kwao itself showed the difference. Towards Dong-sung its lower slopes were covered with long tangled grass, and higher up it is simply loose rubble, which makes the ascent no very easy matter considering the steepness of the slope, which is not very far off a church spire at the top; towards Thanh-moi the descent was much gentler, and the whole hill-side was covered with dense forest, pine-trees, and tangled bushes. The view from the summit is fine of its kind, but it is simply an endless prospect of rolling hills, out of which it was difficult to pick the lie of the valleys. Nevertheless one could trace fairly well the line of the Bac-le route, the Deo-vang and Deo-kwan valleys, and an indistinct kind of a depression which led off to the east, probably in the direction of Phu-trang. Though Lang-son is only about 20 miles off, the fall of the hills in that direction makes it impossible to distinguish anything.

From Dong-sung northwards the valley narrows very considerably and is very tortuous, the width being often no greater than the mere bed of the stream, so that the path had to climb along the mountain sides. The hills themselves retain the same character, bare, grassy, and cupola-shaped, but wherever the defile widened out a little there were stretches of tropical forest; no trees of any great size or value as timber, but occasionally very beautiful from the mass of flowering creepers, leaves, and rattans, hanging down in curtains and graceful festoons. The rays of the sun, when there was any sun in February, could scarcely penetrate through the dense mass of foliage. Occasionally the forest clambered up the sides of the hills, and even reached their crests in long spinnies, with a curiously regular defined edge, which would almost seem to suggest that foresters had been at work. But if this were so it must have been many years ago, for there were not the slightest signs of tree-stumps or any hints of forest growth beyond the sharply marked dense line of vegetation. Neither would forest fires have accounted for the singularly defined character of these patches of forest. The cause has yet to be explained.

The Chinamen had made a very fair military road all the way down the valley from Lang-son to Dong-sung. There was not much engineering in it. It went straight up and down hillocks instead of going round them, and when it skirted the side of a hill no attempt was made

to prevent the rains from washing it away. But for China and Tong-king it was a very good road. Roads in China, you are no doubt aware, are made good for two years and bad for ten thousand. But bad roads are better than no roads, and a few more such as this Dong-sung road would do a great deal to open up hill Tong-king.

When Lang-son is approached there are more villages again. They are not very numerous and they are very small, but still they serve to show that a great part of the country here could be cultivated. The cultivation is of the laborious terrace kind so peculiarly Chinese. The rice-fields climb up the hills in staircase fashion in a kind of amphi-theatre, cunningly irrigated by the zigzag diversion of the mountain streams.

The boundary of the Bac-ninh and Lang-son provinces is marked by a gateway, a kind of wooden *pai-fang*—for there is no door to it—which stands on the top of a low ridge, the dividing line between two small streams, both of which flow to the south. The divide, the watershed, between the rivers of Tong-king and those which run into China, is some miles further to the north, near Bao-viay, where the Chinamen made their last stand in front of Lang-son. The range along the Chinese frontier, which is here comparatively close, is very high and apparently heavily wooded. From a little beyond Bao-viay, or the adjacent village of Deo-ky, there is an almost continuous descent into the Lang-son plain.

Lang-son lies near the southern end of a plain, from two to three miles across at its widest part, and from six to eight miles long. The length is somewhat difficult to define, for to the north and to the east the valley of the Song-ki-kung narrows in very much. But if we call the Lang-son plain six miles long, we shall not be very far wrong. Enclosing it about are the same grassy hills that we have been following all the way from Dong-sung; but scattered here and there in the plain itself are a number of needled rocks, rising up as abruptly out of the paddy-fields as the rocky islets of Halong Bay out of the sea. These are detached crags from the singular wall of rock of which we have already had a glimpse near Thanh-moi.

The actual town of Lang-son, like most of the Annamese provincial capitals, is not much of a place. The citadel is a square of five hundred yards to the side, with neither fosse nor bastions. At the south-western angle, a little hill, crowned with a pagoda, surrounded by fine pine-trees, is enclosed within the fortress, and breaks the otherwise perfect square. It forms a kind of ravelin, or keep, and is the only part that could offer any serious defence. The walls are built of very large bricks, fifteen inches long and eight or nine inches deep, and thick. From the surrounding plain, absolutely nothing can be seen but the fern and grass-grown walls. Inside, not very much more is visible. Apart from the residences of the officials, the Tuan-phu, or provincial governor, the Lanh-binh,

or commander of the forces, the Kwan-bo, Kwan-an, and Bam-bien, subordinate officers, there are not above a hundred wretched, thatched shanties, with mud plastered on their woven bamboo walls. The rest is a grassy waste, with here and there a clump of bamboos, bananas or areca palms, and a few of the shallow muddy ponds which the Tong-kinese love so much. Outside the walls there is a random collection of the like hovels, hardly worthy the name of suburbs, and a row of some dozen substantial Chinese shops. All this in a bend on the southern bank of the Song-ki-kung.

Beyond that river, half a mile off to the north, was situated all that was wealthy and prosperous in the Lang-son district, the "Chinese suburb," Ki-lua. Here, cutting one another at right angles in the form of a cross, were two streets of several hundred houses, of the regular Chinese type, narrow and one-storied, running a long way back, with a series of rooms and courts one after the other, and ending in a pigstye and a kitchen garden. Almost every house had its apparatus for crushing sugar-cane, and big vats, or cauldrons, sunk in the earth for the manufacture of rice-spirit and the distilling of star-anis, an oil largely used in perfumery and confectionery, and commanding a very high price, even in Tong-king. Besides this, cotton cloth and yarns, some of native manufacture, coarse but strong, needles and pins, matches, looking-glasses, chandeliers, and the like, pointed not only to money, but to considerable trade, and that trade with China. There were evidently a number of very prosperous citizens in Ki-lua.

In the plain round about were numerous small hamlets and scattered farm-houses, substantially built, with big granaries, byres for buffaloes and oxen, cane-crushing mills, and stills, everything pointing to an agricultural class, far superior in every way to that of the delta, even to the extent of having farm labourers in the offices round about.

The valley narrows, as we have seen, to the north towards Dong-dang, and eastwards towards Hoang-lam, on the Tien-yen road; but everywhere there is cultivation, more particularly of sugar-cane, with fields of pea-nuts and leguminous plants. No small amount of rice is also cultivated, the necessary water being obtained from the river, or the numerous brooks, by an ingenious kind of self-acting water-wheel, which elevates the water to the different levels for terrace cultivation. The system employed in the delta is also to be seen. The farmer and his wife—or more frequently the wife and the daughter, for the men do not do anything if they can help it—stand on each side of a semicircle cut out of the river-bank and scoop up the water with close-woven bamboo buckets tied to ropes, up to a reservoir above, and by several repetitions of this process water can be raised to a level many feet above the river, and moisture sufficient obtained to enable the buffaloes to plough up the soil and the sons and daughters to plant it out with tufts of young rice

brought from the nursery. Everything about and north of Lang-son points not only to an industrious, but to a peaceful population.

This is a somewhat curious fact. We had been led to believe that everything was disorder and oppression. To the south of Lang-son this may be so. On both the Dong-sung and Bac-le roads there are a few, very few, villages, and they are poverty-stricken to the last degree. One does not see even the flocks of cattle which are so common on the hill-sides of the Lang-son valley. This is said to be due to long years of turbulence, raids of banditti, rebel bands from China, and so on. This may be true, but if so, how is it that the villages north and east of Lang-son are so prosperous, and leave their gates so confidingly open to every passer-by?

The explanation seems to be that though on the maps Lang-son is represented as Tongkinese, it is to all intents and purposes Chinese. The town lies beyond the natural divide, it is on the China slope. Between it and the rest of Tong-king there lies a belt of barren mountain country, 50 miles across. It is, in fact, only nominally Tongkinese. The majority of the people are Chinese, and all without exception have got Chinese blood in them. The amount of real authority the Annamese, whether under the northern Lé dynasty, or under the present Nguyens of Annam proper, have possessed in the province has always been of the most shadowy character. The Tuan-phu of Lang-son simply existed. The Chinese tolerated him only because he never ventured to do anything. The Chinese general at the Ki-lua fort managed everything. The place is so separate from Tong-king proper, that the French have been unable to reoccupy it since the cessation of hostilities, simply because of the difficulty of keeping it supplied with provisions and military stores. Unless the Chinese have stepped in to keep order in the place, it is to be feared that it is in a very anarchical condition now.

It may be mentioned that the aboriginal tribes called the Tho—that is to say, the strangers, who live up in the wooded hills—seem to be more akin to the Laos, or Muong tribes, than to the so-called Miao-tsŭ of the South China provinces. I had no opportunity of visiting any of their villages, but the few men I saw seemed to have a large admixture of Chinese blood in them. Of pure Annamese there seemed to be practically none. This is satisfactory from one point of view. The fewer Annamese there are, the less taint there is on the human race, but politically it is decidedly awkward.

In the abrupt jagged rocks already mentioned, there were numerous caves or grottoes. The rock is a kind of prismatic limestone, and most of the separate masses are wormed through and through by lofty caverns. They appear to be all natural caves, though here and there the hand of man is to be seen in the cutting of doorways or niches for images and the like. There is therefore little comparison to be made between

them and the sandstone excavations near Ch'ien-wei-hsien, of which Mr. Colborne Baber has given such an interesting account to this Society. The majority are fitted up as temples, and those in the immediate neighbourhood of Lang-son are not inhabited except by the guardian of the shrine, and during the war time by bands of Chinese soldiers. There was a number of these needled rocks at no great distance to the left of the road between Lang-son and Ki-lua standing in a rough circle like a gigantic Maes How, and these the Chinamen had joined together with earthworks so as to make a singularly picturesque fort. It ought to have been a formidable one, too, but they did not stay to ascertain that. In this rock-fort there were two rock-temples evidently of very considerable antiquity. One was on the exterior face towards Lang-son, approached by some exceedingly bad steps and with a high vaulted entrance. There were comparatively few images, not more than half a dozen, and these trumpery wooden things; but high up above, in a niche, or rather a fairly large chamber, hewn out of the solid rock and reached by a rickety ladder with steps about three feet apart, was the shrine. This sanctuary was perfectly bare except for a figure nearly life-size cut in high relief out of the surface of the rock. It was standing, clothed in long black robes, the head shaved, shoeless, and with a striking haggard face. The features were so remarkable that I endeavoured to find out something about the sculptor and the date, but I was unable to ascertain anything. The Annamese never by any chance know anything. They gaze at you stupidly, and say, *Con byet nya' kwé*—"I don't know, I'm a country lout." This is not satisfactory, but it is indisputably true. A Chinaman is always delighted to afford the fullest information about things of which he knows absolutely nothing, but unfortunately there were no Chinamen alive in Lang-son in the latter part of February. There were many Chinese inscriptions of considerable length, carved deep into the face of the rock, but I had no means of taking a squeeze or a rubbing of them. I will therefore hazard no conjecture as to who the sculptor may have been. The image has none of the perked-up consequential deportment characteristic of the efforts of Chinese artists, and the features are so entirely different from both Annamese and Chinese that it is difficult to believe the carver could have belonged to either country. The shrine is pitch dark and it is only when a joss candle is lighted that one can see the grim shadow of a face. The effect is certainly very remarkable. The roof of the cave is lofty and gloomy, and the curious jargonel-pear shaped stalactites, which hang down far enough to catch the light, give it a very singular appearance.

To the right of the cave is a joss-house covering a part of the face of the rock, carved into a kind of natural altar, cut up in the pigeon-hole fashion Chinamen are fond of. Each chamber had its image, some of them several. Two steep slopes to right and left of this rock led

up to an altar concealed behind with the usual benignant and scowling spirits flanking the contemplative Buddha in the centre.

There is another cave-temple in the interior of the group of rocks, at the back of an open space, where the Chinamen had constructed their second camp. It is approached by a small bridge which is elaborately solid and heavy for the small ditch it has to span. Recently constructed steps lead up to it, and a large inscription over the doorway announces it as "The Cave of the Clouds." The name is due no doubt to the undulating character of the roof, which in the ante-chapel, if it may be so called, is comparatively smooth, except for the rounded risings and depressions. Farther in there are a number of huge stalactites, and from one of these is hung a large bell. There were long rows of wooden and plaster images of considerably over life-size here, but an unscientific and inappreciative soldiery capsized them all, and played great havoc with their noses, arms, and other eligible projections. Here also there were numerous examples of the prim and neatly carved Chinese inscriptions, some of them also, I regret to say, seriously defaced by individuals without any sense of reverence for antiquity or anything else. At the farther end of the main chamber, and at a considerable height, not to be got at without some exciting scrambling, was another recess. The face of this had been chiselled smooth, and here again, carved in half relief was a life-size figure. In contrast to the one we have just been speaking of, this personality was smiling, I hesitate to say grinning. The artist, I imagine, must have been the same for both, for the face here was equally cleverly executed, and was certainly not of the Sinetic type. The body was draped with yellow Buddhist robes, such as one sees on the monks of Burma or Camboja, and the feet were bare, and the shoes, not the monkish sandal, but ordinary slippers, were orderly represented on the sloping ledge on which the presence was supposed to stand. There were several clefts through the roof, enough to let in a dim religious light, and the image had been so placed that the main ray of light fell on the face, an effective trick of which the Buddhists are very fond, as may be seen in the great temple at Pagan, on the Irawadi river. This cave had branches running into the body of the rock and coming out on the farther side; but the Chinamen had used it as a store-house, and rice, gunpowder in bags and loose heaps, torpedoes and cartridges, lay about everywhere. To wander about in the dark led to unpleasant bumps against the roof or against stalactites, and angular limestone is rather awkward to encounter. To wander about with a candle was a little too suggestive of blowing the whole place up. I regret, therefore, that I can do no more than commend the Cave of the Clouds to explorers who have more learning and greater leisure than myself.

Such a qualified observer will find yet another large cave-temple in

another large isolated rock to the south of the citadel. The entrance is some 40 or 50 feet above the level of the plain, but there is a rough kind of approach, half-stair, half-slope. The entrance has been fashioned into the shape of a regular doorway with some big slabs of stone. A number of statuettes are carved out of the rock round the walls, mostly recently defaced, and the other images are all overthrown. This rock is honeycombed through and through. One can climb up by the inside to the top, and there are windows on to the plain on all sides and at all heights. It is full of bats, and there used to be a resident priest. He was lying dead across the doorway when I was there, with a Turco's bullet through his head. The Chinamen had used parts of the cave all round as guard-rooms and sentry-boxes. There are many more of these rock-temples, both in the neighbourhood of Lang-son, and in the wall of rock which runs in serpentine fashion through north Tong-king, appearing at Dong-dang, at Truong-khanh, and again far over in the west at My-duc and near Ninh-binh. These three were, however, the most important that came under my notice.

To return again to the geography of the neighbourhood, we find an unsolved problem in the course of the Song-ki-kung. That it flows into China east of That-khe is certain, but where it goes afterwards is a subject of very violent debate in Tong-king. The river rises in the hills to the east and a little to the south of Lang-son. How far off is not known. I have been about 12 miles up its course beyond Hoang-lam, but there are no signs there that its source is nearer than 20 miles. There was a theory prevalent in Lang-son that a short and easy road led by the valley of the Song-ki-kung to the Kwang-yen coast at Tien-yen. A river * comes down to that town, and it was supposed that it must nearly meet the Lang-son river. Reconnaissances, however, failed to ascertain anything definite. The Chinese had certainly used the route to bring up men and stores to Lang-son, but they did not start from Tien-yen. They came either from Mong-kai, or from the mouth of the Lang-moon, or Ngan-nan river, and this only because it was vastly less laborious than the overland passage from Nan-ning on the West River, which was the alternative route for the conveyance of material of war. At Lang-son a native said it was three days' march to the sea. At Hoang-lam one villager said it was twelve days and another eight. Complacent ignorance will go to very great lengths. The question is important on account of the difficulty of bringing supplies up to Lang-son.

There remains the question of what becomes of the Song-ki-kung. There are still found some who maintain that it falls into the sea at Cape Pak-lung, the northern boundary of Tong-king. If it does it must turn back almost directly on its course. For 50 miles it flows due north to That-khe, and then crosses the Chinese border. Some declare that it falls into the West River, south of Nan-ning, and so connects

* The Song-tam of M. Romanet du Caillaud.

Lang-son directly with Canton. This is extremely improbable, and the numerous voyagers who have gone up the West River talk of no such affluent. More probably it is simply the Upper Lang-moon or the Ngan-nan Kiang. In any case it seems to furnish one more proof that Lang-son, by the nature of the country and the laws of physical geography, belongs to China and not to Tong-king.

The Song-ki-kung flows under two sides of the citadel of Lang-son, and from there to Dong-lam, where it again strikes the north road, is navigable only for small boats, though in the rains it is possible that junks might make the passage. The banks are fairly high and the average width is about 150 feet. Out-cropping ledges of rock probably prevent it from being navigable for any but boats of the lightest draught. Between Dong-lam and That-khe the river has to be forded about a dozen times, but at the latter town regular junk navigation begins, and there seems to be a good deal of traffic with the Chinese prefecture of Lung-chao, a large town of 150,000 inhabitants.

The road to Dong-dang from Lang-son is fairly good. It is the old Mandarin road improved by the Chinese sappers, but it would bear a good deal more improvement. It is about eight miles to Dong-dang, and about three miles short of this town the valley ceases and the road twists about in the hollow round the flanks of multitudinous grassy hills, out of which it again emerges into the little circular plain in which Dong-dang lies, surrounded on all sides by big hills, those on the north wooded and precipitous. The sharp contrast between the jumble of grassy hills and this line of abrupt crags which run off to the eastward to Cua-ai, the frontier gate, and making an angle at Dong-dang, northward towards That-khe, is very marked. Dong-dang is a compact little town with one long street of good Chinese shops, with not a few articles of English manufacture in them, notably, some cough lozenges from a place in St. Paul's Churchyard. The advertisement of these, with a picture of the cathedral, was pasted up in a prominent place on the counter.

From Dong-dang to Cua-ai, the frontier gate between Tong-king and China, is about three miles, the road following the wall of cliffs just mentioned. Cua-ai is a mere collection of some twenty mud huts, down in the bottom of the narrow defile which joins the two countries. The frontier gate itself was a heavy Norman arch, about thirty feet long, almost like a tunnel, and with a joss-house perched on the top. A joss-house at about forty feet distance faced the gate on each side, that in Kwang-si being used as a storehouse. Up the mountain slope on either side, for a distance of a few hundred yards or so, ran a puny wall, the thickness of the length of a brick, with loopholes and staircase ledges. For a frontier wall it was absurd. It would have been an inefficient garden wall in an unscrupulous neighbourhood. Still it defines a point on the frontier. To determine the rest will be a very difficult and delicate

matter. The ascent of the highest peak in the immediate neighbourhood only served to show that the line of mountains continued on every side with no perceptible signs of a definite parting. The French blew up the frontier gate as an earnest of possession.

A reconnaissance went out the That-khe road as far as Dong-lam. Dong-lam is perhaps a little smaller than Dong-dang, with two-thirds of the houses built of brick, and inhabited by Chinese. It is surrounded by a stockade and a live bamboo fence to keep out the tigers, which are excessively numerous in the hills. The road is very picturesque, the wooded rocky wall on the right, the little hills and a large part of the level ground covered with thick jungle. All the inhabitants, except the Chinamen, are the Tho mountaineers. Their houses are built on piles in the Laos and Burmese fashion, and all close together, in marked contrast with the straggling style of the Tongkinese. The cattle, of which there are large numbers, and the pigs and fowls live below, and the family above. The inhabitants all vanished before the French troops. There was therefore no opportunity of examining or questioning them. They seemed, however, to be very well off, and the fact that their villages were built on the hills and were palisaded pointed rather to safety from wild beasts than to the presence of robbers. Maize, white and red, a certain amount of rice, and the star-anis, seemed to be what they chiefly cultivated.

The star-anis is an evergreen shrub, with a leaf not unlike the bay, and a pentagonal seed very highly scented. From this is expressed the oil called by the Tongkinese *dau-hoi* (scented oil), and by the French *l'huile de badiane*. The bush is very local. The Chinamen boil the seed-pods in a huge caldron with water. Inside this caldron there is a small internal vessel filled with cold water, which is constantly renewed. The steam and oil are condensed on the sides of this vessel, and are drawn off by a small bamboo runlet into a tin receiver; another runlet allows the water from this pan to drain back into the boiler. One boiling lasts over a day and a half, and produces about fifteen pounds weight of the perfumed oil. A picul, 117 lbs. weight, of the oil, costs between 30*l.* and 40*l.* At present the great part of the star-anis oil goes into China, mostly down the Song-ki-kung.

From That-khé there is a road which leads westwards to Cao-banh, which is about six days' journey from Lang-son. The character of the track seems to be much the same as that of the Dong-dang-That-khe road, over wooded rocky hills, through troublesome gorges, and with no places of the slightest importance that are not practically Chinese. Cao-banh is the place of exile for disgraced Annamese officials, the Annamese Ili, or Moh-goung, or Siberia, but nevertheless, from the report of Père Fuentes, the only European who has penetrated thither, it seems to lie in a very fertile plain, but in a plain which is beyond the Tongkinese watershed.

I returned from Lang-son to Hanoi by the Mandarin road. This route was not used by the French, who found the Dong-sung track quicker and better. The first brigade had returned that way some weeks before and had driven out the Chinese garrisons, but there were still many stragglers about, and I was absolutely forbidden to go. I succeeded however in getting away, and struck the Cut road over the hills. There was too much danger however to loiter, and I had to make stages of 30 miles a day, and to sleep in the bush. I cannot therefore do more than give you a flying sketch. From Lang-son to Cut the road winds through the same rounded grassy hills of which I dare say you are as tired as I certainly was. There were some rather heavy ascents and descents, with innumerable fordings of a troublesome little brook, which expanded into a marsh, where one had to wade through it. Just north of Cut the crest of the watershed is reached. On one side the brook I have spoken of runs north into the Song-ki-kung, on the other side rises the Song-thuong, which helps to make up the Thai-binh. There is a very heavy and long descent of over a mile into the Song-thuong basin, but the view down the valley from near what used to be the French heliograph station, is superb. On the eastern side are huge forest-covered hills, on the western a wall of sheer precipices, and in the valley between, varying from half a mile to a mile wide, there are patches of forest, tangles of tall grass jungle, and near Cut and Thanh-moi a considerable amount of cultivated ground, with here and there low hills rising up and causing the Song-thuong, here a shallow, pebbly stream, 20 feet across, to meander from one side of the valley to the other. That night I slept near the burnt-out village of Dong.

This is just abreast of the point where the abrupt line of cliffs I have spoken of strikes the valley. The range is most extraordinary. One is accustomed to the saw-like outline of a range of hills viewed from a distance. Here, however, is a line of heights rising to from 600 to 900 feet sheer up from the level ground, and with the individual peaks as nearly as possible in a straight line. They are of a kind of prismatic limestone, some mere huge naked rocks with gashes separating them from the continuous wall, others with bushes and even large trees clinging to the clefts in their precipitous sides. Occasionally there is a gigantic detached cliff, standing out in the plain, as big as the Bass Rock, and nearly as bare, and behind the first ridge there are other huge reefs of rock of the same character, running back into a central mass which I should very much like to have explored. But the rocks were full of caves, and that there were Chinamen in these caves I had such occasional ocular proof that closer inspection was out of the question.

One can see isolated limestone peaks of the same kind in the flat country above Maulmein in British Burma, and along the course of the West River in Kwang-tung and Kwang-si, but nowhere as far as I

know are the peaks so regularly connected, or so lofty as here. The singular thing is that this range seems to zigzag about all North Tong-king. We saw detached boulders from it in the Lang-son plain, and at Dong-dang, and between that place and Dong-lam the road skirts the actual range again. At Dong the jagged line comes in from the north-west, follows or rather directs the Mandarin road for nearly 30 miles, and then strikes off again to the west, and apparently back to the north, for at Yen-the it is not to be seen, nor at Thai-nguyen, nor Tuyen-kwan; but away over in the west we meet it again from My-luong down to My-duc, and southwards to Ke-so, and Ninh-binh. The sight is so far as I know unique, and the ragged line would be worth tracing out.

From Dong southwards, as I have said, the path runs along the foot of this wall. The valley to the left is well wooded in clumps. There are houses scattered about in twos and threes here and there, and occasionally a banyan, of which there are some magnificent specimens, shades a wayside temple. The Song-thuong, swollen by mountain rivulets that pour down the wooded hills on the eastern side, or leap in cascades from the cliffs, gets steadily bigger, until when it is last forded at the bridge of the Goddess of Mercy (which does not exist, and never seems to have existed) it takes one nearly up to the waist. This is the place where the French column was nearly cut to pieces in June 1884, and it is here that the pinnacled chain strikes away westward.

Some distance north of this is passed the Phu, or prefectural town of Truong-khanh. The Chinese built a camp and a number of forts round about it, and changed its name to Thanh-moi. Between Thanh-moi and the mythical bridge of the Goddess of Mercy the whole width of the valley is covered with dense forest, and one is not surprised to hear that in the old days considerable timber trade was done here, the logs being floated down the Song-thuong. In the middle of this forest is passed a very sacred and ancient temple, erected over a huge statue of the chief spirit of the mountains. Close at hand is a rickety bamboo bridge over one of the deep ravines which are far too common all along the road. The inhabitants say that it is necessary to propitiate this genius before venturing over the bridge. Whether this piety is always effectual or not I do not know, but certainly great care is necessary to effect the passage, whether after due reverence paid or not. The Genius of the Mountains, I regret to say, had his head knocked off by the soldiers of General Brière de l'Isle's brigade.

After passing the ford of the bridge of the Goddess of Mercy the path inclines a little to the eastward, and the country opens out more, but only into a tangle of hills, some wooded, some bare, with a great deal of forest and some cleared ground, variegated with morasses in the hollows, which would no doubt be rice-fields if there were any

inhabitants. The walking is very heavy, up and down hill and through these quaking swamps. Under a friendly clump of bamboos on the edge of a forest stream, with dense forest all round about, I passed the second night.

Next day was a tramp through much the same sort of country, a mass of low hills, mostly wooded, with long stretches of forest where the path, covered with boulders, seemed to be a torrent bed in the rains, the whole cut up in every direction with valleys and water-courses. The village of Bac-le, which never was of any great size, now exists no more. The plateau on which it stood shows no more than the crumbling remains of the walls of the houses, built of a kind of artificial conglomerate of earth mixed with gravel. South of Bac-le again there is a zone of hills considerably higher, with the same abundance of forest. But after this the country opens out more and more, though there are no villages to speak of, notwithstanding the abundance of rivulets which supply plenty of water for rice-growth, and in fact, in the rains overflow the hollows and make the route impracticable for days on end. At length, after again catching sight of the Song-thuong at Cau-son, to which point it is navigable, Kep is reached, about seventy-five miles from Lang-son.

The most noticeable thing about this tract of hilly country, is that on the Tong-king side, both by the Mandarin and Dong-sung roads, it is almost entirely uncultivated and uninhabited, whereas on the Chinese side, that is, beyond Cut and Deo-ky, the villages if small, are fairly numerous, and a very considerable amount of cultivation is carried on. This is very clearly marked by the watershed, and suggests political questions, which however I will not trouble you with. Along the whole route there are no signs of the minerals, whether gold, silver, or tin, which were expected to be found there. The Annamese records speak of mines, but if they existed, they have not been worked for many years. Any wealth the country possesses is in its timber, and in the resins and gums which may be obtained from the hill forests.

The only other part of hilly Tong-king that is as yet known is over on the western side, up the Tsin-ho to Tuyen-kwan. Here the main range is not reached. Relative to the mountain ranges, Tuyen-kwan occupies the position that Kep or Chu do to Lang-son. Tuyen-kwan lies about fifty miles above the mouth of the Rivière Claire, and the river is the only means of getting at it at present. This is unfortunate, for during the dry season the ascent can only be made by launches of very light draught, and even they are apt to get aground at a point Dyuoc, where the river makes a very sharp turn, almost at right angles between low cliffs. The scenery all the way up is picturesque, but the hills are low and covered with secondary jungle, and the villages are few. In fact, Tuyen-kwan lies just on the verge of the forest country, and the population is very poverty-stricken, living only on the fish

which they get out of the river, and on what profit they can make out of the rattans cut on the scrub-covered hills.

Tuyen-kwan, like many other Chinese and Annamese citadels, is in an ideally absurd position from a military point of view. It is a small square with demi-lunes in the middle of the four sides, the river on one face, and the hills all round about. The nearest are a quarter of a mile off and completely command both town and citadel, the latter with its little sugar-loaf hill in the middle. Other hills in circles, farther and farther off, rise higher and higher, and offer a tempting position to the gunner. The position is therefore a most unsatisfactory one for an outpost, and the French forces will no doubt move farther north this winter. But the country here is not only mountainous, but covered with almost impenetrable forest. There are no towns till the strongholds of the Black Flags and other Chinese outlaws are reached. These men are desperadoes, who have no home if they are turned out of their present settlements. It is therefore greatly to be feared that this part of Tong-king, even more than the whole of the rest of the north, will not be pacified for a very long time. Rumour credits it with being very rich in metals, as it certainly is in timber, but it is greatly to be feared that it will be long before this Society gets a more detailed account of the country than the imperfect glimpse I have been able to give you. The hills are occupied by wild tribes, of a race allied to the Laos, with mere local dialectic differences. The valleys, and such few plateaux as there are, are cultivated by a population which is considerably more than half Chinese. At present, they are practically under no rule whatever. The Annamese never had any but a theoretical authority. The Chinese are debarred from interfering by the Treaty of Tientsin. The French unhappily do not seem to have enough men to exercise their protectorate without seriously endangering the state of affairs in the Delta. Independent explorers meet with the traditional "half-brick" welcome. It is therefore unfortunately only too probable that the northern provinces of Tong-king will remain for some time comparatively unknown.

After the paper,

Prof. Terrien de La Couperie read the following remarks:—I wish to say a few words on two particular points of the interesting lecture we have just heard. Mr. J. G. Scott, whom we know much by his literary pseudonym of Shway-yoe, has spoken of aboriginal tribes of Upper Tongking named Tö or Thö, and he tells us that they seem to have a large admixture of Chinese blood in them, and that their name means 'strangers.' He says also that they seem to be more akin to the Laos, or Muang tribes than to the so-called Miao-tzŭ of the South-China provinces, and that they build their houses on piles in the Laos and Burmese fashion, and all close together, in marked contrast with the straggling style of the Tongkinese. In order to appreciate the interest of these scraps of information, scanty as they are, it is necessary to state that we know nothing else about these tribes. Mr. A. Aumoitte, in a short record of his journey from Hanoi to the frontier of Kwangsi, gives no details about them, excepting an evaluation of their number to about 3000 souls. Dr. A.

Bastian, in his 'Remarks on the Indo-Chinese Alphabets,' says that an alphabet given to him by a Shan of the Yuns, who live at Küntun, near the frontier of Yunnan, may probably resemble that of the Quanto, the ancestors of the Tongkinese, before the wild Giao-chi were civilised by the Chinese colonists. These Quanto are, of course, the same as the Thö of Mr. J. G. Scott, and the Tö of Mr. Aumoitte. The longer name may be the genuine name, or it may not. Anyhow, it has assumed or preserved an Annamese appearance. *Quan*, among other meanings, has that of 'flock,' 'soldiers,' 'horde,' and *Tö* means 'class,' or 'same,' while adding the aspirate as Mr. Scott does, *Thö*, it means 'child,' or 'workman.' But we find nothing like, or connected with, the meaning 'strangers,' given by Mr. Scott. All this is somewhat guess-work, and cannot be settled, since we do not know the native transcription of the name. The full name *Quanto* recalls names somewhat similar, which, however, cannot resist analysis, like those of the Khiungtha, an Arrakanese tribe, and of the Goungdhō, north-west of Mobyay, near the Karennee. But these resemblances are mere moonshines, and cannot resist inquiry. *Khiungtha*, otherwise 'sons of the river,' is in reality *Khiungza*, written with the Burmese *th*, which sounds as in English, and *Goungdhö* is the Burmese nickname from their custom of wearing the hair short, with a pendant lock from each temple, of a peculiar tribe self-named Let-hta. So that *Quanto*, as a name, remains alone, and appears to be an Annamite compound as I have suggested, in which case *To*, *Tö*, or *Thö*, would be the ethnical name of this population. It is difficult to reconcile the meaning of 'strangers,' and their intrusion in the country which it implies, with the character of native, indigenous, or aboriginal population attributed to them by other authorities. In Annamese history we do not hear of them. I find in the 'Hoang viet dia du chi'—a native historical geography of the country—that the present provinces and divisions of Cao-lang, Langson, Thai-nguyen, Tuyen-quang and Hanoi were parts of the state of Lac-long, which is said to have existed there at the beginning of history. The period which was magnified backwards by the Annamese compilers to the twenty-ninth century before our era, may be, from internal evidence, boiled down to the seventh century, and it then matches with apparently the same historical facts known from safer sources. The prince of Lac-long, whose personal name was Sùng-lam, was the son of the king Kinh-düöng, from Wù-lành, by his wife, daughter of the Prince of Dæng-dinh. Under their Annamese dress these geographical names say nothing, and they have remained unexplained. But should we consider that they are only the Annamese pronunciation of well-known Chinese names, their identification throws a great deal of light on the legend. Ngu-lanh, otherwise Wu-ling, was the mountainous region in the west of Hunan province, and Dæng-dinh, otherwise Tung-ting, is the name of the great lake in the same province, both in central China. *Lac-lung*, which in Annamese means "Fox-dragon," is apparently a distortion for the sake of the wonderful, from a name which was in reality Lok-luang or King Lo, in Chinese Lo-wang, the form under which it appears in Chinese history. This would suggest a Shan parentage, which is rendered still more probable by the reference to the Wu-ling region as to their origin.

The Chinese dominion at that time had not yet extended south of the Yang-tsze-kiang, and the only powerful State which had an influence there, in the centre of China, was the kingdom of Tsu (probably Teru). Now we read in history, that in 699 B.C., the king of Tsu overwhelmed the people of Lo near the banks of the Yang-tsze. This means that the population was partly destroyed, partly absorbed, and partly expelled. The migration southwards which then took place forcibly, was most probably that which resulted in the establishment of the State of Lac-lung, in Northern Tongking.

The next stratum of population was an extension from that of Kwangtung and Kwangsi, which took place about 215 B.C., and was most likely *Karen* who had gradually reached there from their north settlements in Hunan, where they had originally formed the nucleus of the state of Tsu. The name of the region about Canton was Pan-yu, which is still the self-name of a portion of the Karens. At the above date a Chinese general, Jen-Hiao, drove south in Kwangtung 500,000 colonists from the Mön tribes of the Eastern Ngou in Chehkiang; under the pressure of the new comers, the former inhabitants extended westwards, however for no purpose, since the successor of Jen Hiao, known as Tchao T'o, who had made himself independent, conquered the region of Tong-king in 202 B.C. His dynasty, with its capital at Canton, ruled until 106 B.C., and is reckoned in Annamese history among their former dynasties.

Now Quanto, the present name of the aboriginal tribes described by Mr. Scott, means 'Soldiers of To,' as well as 'Horde of To.' Is it too bold an hypothesis of mine to suggest that they might be the descendants of the soldiers of the conqueror? We could then understand how the name *Tō* is taken for 'stranger,' and is otherwise difficult to explain with the help of the Annamese vocabularies we have consulted on the matter.

The other most interesting and new point of the lecture of Mr. J. G. Scott on which I wish to add a few words, concerns the cave-temples near Lang-son. M. Aumoitte had seen two, about which he says only a few lines. He saw the one bonze, keeper of a cave; perhaps the same man whom Mr. Scott saw dead from a wanton shot of a French Turco. But M. Aumoitte did not see the third cave, the most important, of which Mr. Scott has just given us a valuable description. We shall probably hear more about them from one or the other of the learned Sinologists, who, I am told, were enabled to join the Chinese commission of delimitation of the frontier of Tong-king. They will be able to read the many Chinese inscriptions spoken of by Mr. Scott, and probably find there some historical information about the caves.

In the meantime, I may be permitted to say that I have found to-day, in the native historical geography, the 'Hoang viet dia du chi,' which I have already quoted, a short description of the same caves. It is more childish than precise, and not much can be gathered from its perusal. It speaks of the Song-tien dong, or two hermits cave, in the south of the Loc-ma hill; and also of the Mai-pha, Tam-thanh, and U-tich caves. We are told at length of curiously shaped rocks in the vicinity, resembling a woman, an elephant with a human head, &c., and also of the Qui Quan tu, or devil-gate temple, as well as of those of Chi-lang, Tam-thanh, and Tam-giao. But nothing is said of the contents of the caves, nor of the figures therein. The most remote period spoken of about them is that which follows immediately the time of the Ngo usurpers in the tenth century, previous to the Dinh dynasty, namely, 958-968 A.D.

The PRESIDENT said the paper which had been read must have reminded the meeting of the full and graphic letters which appeared in the columns of one of the leading journals, and which came from the author of the paper during the time of the French campaign in Tong-king. The country seemed well worthy of investigation, and it was to be hoped that the French would encourage scientific men to accompany any military recognisances northward, in order that a clear knowledge might be obtained of the upper courses of the streams which enabled the Tonkinese to form near the sea the marvellous system of fluvial canals there. In conclusion, he proposed a vote of thanks to Mr. Scott for the paper, which they had had great pleasure in listening to.

*Recent Explorations in the Basin of the Volta (Gold Coast) by Missionaries of the Basel Missionary Society.**

Map, p. 288.

Among the various missionary societies at work in Western Africa, that of Basel has more especially deserved and received the praise of travellers, for not merely teaching the tenets of the Christian faith, but also for imparting to its pupils some useful trades. Its establishment dates back to 1828, and of the nine missionaries who went out in that year, the Rev. A. Riis is the only survivor. In 1835 Akropong in Aquapem was first occupied, and when that place had to be temporarily abandoned in 1839, owing to civil war, the Rev. A. Riis paid a visit to Kumase, at that time still the seat of a powerful empire, in the vain hope of being permitted to establish himself there. In 1843, the missionaries were able once more to return to Akropong, which has since remained their head-quarters, and where a seminary for training native teachers has been established by them. In 1853, Gyadam, in Akem, was occupied, and that place having been burnt down in 1860, the mission was removed to Kyebi (the capital of Akem), and a new station established at Kukurantumi. In 1864 a mission was established at Anum, to the east of the Volta, and it was from that place Ramseyer and Kühne were carried off in 1869, and detained prisoners at Kumase until liberated by a British army in 1874. The power of Asante having been broken, a further development of the mission became possible. In 1875 Begoro, in Akem, and Abetifi, the chief place of Okwawu-Kodiabe, until then in the power of Asante, were occupied, and have been held ever since. The missionaries even hoped that they would be permitted to extend their operations to Kumase, on the one hand, and to Salaga, the famous trading town, on the other. Salaga was actually visited in 1877 by two native missionaries, David Asante and Theophil Opoku, both of whom started from Abetifi, the former in January, the latter a month later. It was again visited in 1878 by the Rev. Th. Buss. As the prospects in that stronghold of Mahommedanism did not appear to be very promising, the missionary society directed its attention once more to Kumase. On February 6th, 1881, Messrs. Buck and Huppenbauer arrived at that place, coming from Kyebi; they were succeeded on September 1st of the same year by Messrs. Ramseyer and A. Mohr, from Abetifi, and on August 12th, 1882, by Messrs. F. Ramseyer and David Asante from the same place. Neither of these missions proved very encouraging. The king had no objections to missionaries as occasional visitors, but he most strongly demurred to their settling down for a permanence, and a basket of rotten eggs, which he presented to Mr. Ramseyer as a parting gift, hardly looked as if he felt very benevolently towards them. Mr. Ramseyer does not think that there is any chance of useful mission-work at Kumase until Asante shall have been completely broken up. Human sacrifices are no longer practised in public, but the hope of a restoration to power is not yet quite dead in the breasts of the king and his chiefs, notwithstanding the poverty resulting from the loss of the trade monopoly with the interior, and the falling away of all the outlying provinces.

Kumase proving thus inaccessible, for the present at all events, attention was directed to other fields. In 1882 the Rev. A. Mohr visited the principal towns of

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* From communications of the Rev. J. C. Christaller, for many years a missionary on the Gold Coast, and author of 'A Grammar of the Asante and Fante Language' (1875), and of a 'Dictionary of the Asante and Fante Language' (1882).

Akem-Kotoku,* to the south-west of Begoro; in the same year Mr. J. Müller made a tour through Akem-Asante, the capital of which is Bompata, and in 1883 Mr. G. Dilger paid a visit to Kumawu in Osekyere, to the W.N.W. of Abetifi, formerly dependent upon Asante. Salaga and the upper Volta likewise attracted attention. In 1884 Mr. Ramseyer visited Krakye on the Volta, the capital of a powerful confederation which has rallied round the high priest of the Dente fetish, and in the same year an expedition headed by Dr. E. Mähly and accompanied by Mr. J. Müller and David Asante, travelled through the districts east of the Volta to Salaga, whence the two Europeans returned down the river, whilst David Asante struck out a more easterly course, which took him through the interesting "mountain-land" of Booso or Obooso, not hitherto visited by scientific explorers.

These various expeditions have naturally extended our geographical knowledge, notwithstanding that none of these missionaries were scientific travellers able to lay down the routes followed in a trustworthy manner. Accounts of these expeditions have been published in the 'Records of the Basel Missionary Society' and in the 'Journal of the Geographical Society of Jena.' The results, as far as they are capable of cartographic delineation, are presented in two maps, viz. 'A map of the Gold Coast and Inland Countries between and beyond the Pra and the Volta,' by the Basel missionaries, 1884 (scale 1:300,000); and 'Die Goldküste ostwärts vom Fluss Pra und das Gebiet des Volta,' 1885 (scale 1:800,000). These materials combined with the results obtained by Captain Lonsdale and other British explorers, whose journeys are even more extensive than those of the missionaries, enable us to construct a map of the Gold Coast region far superior to any that has hitherto been published. For the present, however, we limit ourselves to a reproduction, on a small scale, of the Basel maps, and we illustrate this sketch by an account of three missionary journeys which were performed in 1883 and 1884.†

Abetifi, the starting-point of two of these, is the capital of the small hill-country of Okwawu-Kodiabe, which lies at a distance of 95 miles from the coast, and has a population of about 36,000 souls. The Okwawu also occupy Kamana and Okwawu-Asabi, to the west of the Volta, Akoroso, and Pae. Formerly, as the allies of Asante, they also held Okwawu-Dukomang, to the north of Boem, but after the capture of Kumase, in 1874, the Boefo fell upon and nearly annihilated them. The few who escaped massacre either "gave" themselves to the fetishes Fruko in Adele and Dente in Krakye, or live as outcasts in the woods.

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* Oda or Nsuaem, the capital of Akem-Kotoku, stands near the Berem river, and includes an "old" town with crooked lanes, and a "new" town with broad streets. The king's palace occupies the top of a hill in the centre of the new town. The king desired missionaries to settle in his country to turn away his people from the fetishes. As to himself, "that was another matter." Soadra, another large town, lies about ten minutes to the south of Oda, and its chief, Duke Kofi Ahenkora, heeds but little the behests of his sovereign. His residence stands on the top of a steep hill. Within a radius of three or four miles of these two towns there resides a population of 20,000 souls or more. The roads throughout this district are well swept. The trade is usually with Akemfo (Salt-pond), which receives palm oil in exchange for European goods. Akyease, one hour and a half to the south of Soadra, belongs to Akem-Abuakwa. It is a straggling place, with many good houses, some of them two storeys high, and an excellent supply of spring water. A greyish loam, capitally suited for the manufacture of bricks, occurs extensively in the valley of the Berem.

† The names are spelt, as far as practicable, according to the rules laid down by the Council of the Royal Geographical Society. Thus, *tsh* of the missionaries is expressed by *ch*, *wh* by *f*, *n̈* by *ng*. All vowels must be pronounced separately. The altitudes along the route to Salaga are from Dr. Mähly's observations.

Rev. G. Dilger's Visit to Kumawu, August 1883.

The Rev. G. Dilger, a missionary stationed at Abetifi, having visited in the earlier part of August 1883 ten villages in Asante-Akem, proceeded by way of Konom-ngo and Odumase to Dwiransa, the decayed old capital of Asante-Akem. Thence he started on August 20th for Kumawu. Having crossed the Owere, the boundary stream, he reached after a march of a few miles the town of Domeabra ("come and love me"), at that time the frontier town of Asante. A dense fog covered the country on the following morning. He started notwithstanding. After a short rest at Dome he took a narrow path through fields, shrub, and wet grass, which brought him to Animsuwa, where he breakfasted. The remainder of the journey led through numerous hamlets to Wiawoso ("sun is above"), built like an eagle's eyrie on a hill at the foot of the Kumawu Mountains. The appearance of the country here undergoes a pleasant change. The "roads" are broader and cleaner; the forests less dense, and occasionally quite free from underwood; the air appears to be more bracing and purer; the people exhibit more intelligence and are wealthier. Numerous fugitives from other parts of Kumawu were met with at Wiawoso.

An early start was made on the 21st. The road first led down into a valley, beyond which a steep slope had to be climbed, but having accomplished this a splendid prospect rewarded an hour's arduous labour. Further on the road crossed hill after hill. At noon a tremendous mass of rock was reached, which afforded shelter to numerous fugitives. A sparkling rivulet precipitated itself over its edge into a deep ravine. Three hours more of climbing brought the traveller to Wraso, a beautiful town, partly situate on the slope of a mountain, in the midst of plantations, and encircled by an amphitheatre of wooded hills. Wraso has 3000 inhabitants, and is the residence of the heir-apparent, who received his visitor with much kindness.

On the 23rd Obodumase, a pretty large town, was reached. The road was easy, though hilly; fine plantations abounded, and they alternated with stretches of forest, rendered fragrant by ananas, though quite free from underwood. Each village had a neat temple, in which the idol Tanno, imported from Gyamang, was placed.

On the 24th Mr. Dilger continued his journey to Kumawu. This town is stated to have had seventy-seven streets or lanes formerly, and the many groups of houses, now separated by thickets of wild sugar-cane, seem to bear this out. The people of Dwabén and of Kumase had repeatedly sacked this place, butchering many of the inhabitants and carrying off numerous prisoners.

On August 27th Mr. Dilger left Kumawu. A march of eleven hours through a fine forest and past a few hamlets and hunters' huts took him to Agogo, a large town in a healthy position. Thence in two days (fifteen hours' march) he reached Abenne, a village of Okwawu, and on the 30th August he was back at Abetifi.

Rev. Fr. Ramseyer's Journey to Krakye on the Volta, 1884.*

Seated in the verandah of the missionary house at Abetifi, in the beautiful hill-country of Okwawu, the eye ranges to the northward over a blueish-grey expanse of country, which stretches away to the horizon, and sometimes assumes the appearance of a sea. This is the Afram-Volta plain, which notwithstanding its uniformity creates an almost irresistible desire to explore it, and to ascertain whether it is given up exclusively to buffaloes, elephants, and gazelles, the easy prey of the lion,

* From a manuscript forwarded by the Rev. J. C. Christaller.

or whether it is inhabited. We knew that if we crossed this plain in a north-easterly direction during seven days we should reach Krakye on the Volta,* and were told that ten days to the northward there lay Atabuobu (Ateobu), a densely peopled region, which had thrown off the yoke of Asante in 1874, and where a missionary station might be established with a fair chance of success.

I have often envied our brethren in South Africa on account of their waggons. Our attempts to introduce beasts of draught or burden have hitherto come to nothing, partly owing to the difficulty of keeping the roads open, partly also because horses do not bear the climate very well. We are thus compelled to have recourse to carriers. In a wooded country like Okwawu it is possible to walk, but this would not be safe when crossing scorched grass-plains. Hence our little party, in addition to Kwabi, a "catechist," and men to carry provisions, and articles of barter, included also six bearers for my hammock.

We were ready to start early on March 13th, 1884, but our carriers delayed us until 11 A.M. A march of a couple of hours took us to Sadang, at the foot of the hill, and as this was the last village we expected to meet with for some time our people were soon busy preparing *fufu* (pulp of yams), so that they might enjoy a full meal before facing the deprivations of the wilderness. The village was full of people who were either going to Sataga, or who had just returned from that place. The latter were readily distinguished by their lean appearance, and by the burdens of vegetable butter (made of a kind of nut) which they carried with them. Some of them had slaves, who were busily and joyously engaged in the preparation of fufu, and looked forward to a good meal after several days' starvation.

It was half-past three before we started. The road led through a charming wood, and it was night before we arrived at Aframso, a cluster of huts on an arm of the Afram, now nearly dry. At certain seasons this locality is visited by hundreds of people from Okwawu, who go there to fish. Each visitor brings with him a bundle of *efe* (a herb), the whole of which is thrown altogether in a heap, around which the multitude assembles on the ensuing morning. The fetish priest having mumbled a few exorcisms, those present throw themselves upon the heap, gather up in their hands as much as they can carry, and throw it into the stream. This stupefies the fish (a silurus) which rise to the surface, and thus fall an easy prey to their pursuers. These meetings are occasions of the coarsest excesses, and respectable people do not allow their daughters to attend them.

Early on the following morning (March 14th) we were ferried over the river, which was even then 70 feet wide. The Afram is "fetish," and the natives saluted it with an elongated hiss. A few paces beyond the river the grassy plain begins. It resembles a park. The tender grass grows to a height of eighteen inches, and the plain is dotted with crooked trees. At intervals of half an hour or less clumps of trees were met with near small rivulets which during this part of the year dry up. Heavy dew had fallen during the night. At noon we reached Gyaneboaso, a camping place, and we took up our quarters in the dry bed of a rivulet. Excellent water was, however, found a little lower down, among some blocks of rock.†

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* D. Asante, who crossed this plain in 1877, took thirty hours; Th. Opoku, who did so in the same year, seven days; and Ph. Buss, in 1878, six days. The latter observed much sandstone, red and white, and near the Waa passed a mass of red sandstone rising one hundred feet above the plain for nearly half a mile.

† The grass in the plain grows to man's height, but is burnt in January. In March it has once more grown to a height of 18 inches. The soil is exceedingly fertile, and there is no lack of water. Game abounds, including antelopes, buffaloes, boars, elephants, lions, and leopards. There are no permanent inhabitants.

After a hearty meal we started, and at 3 P.M. arrived at Kochebo (Kotweboom), our night's camp, lying at the foot of an isolated hill which rises almost perpendicularly to a height of 200 feet. Two deserted huts of Okwawu hunters stood near.

On March 15th our road led over a uniform plain. We crossed the Bosombone, which lower down grows into an important tributary of the Volta, and after a march of five hours arrived at a hunter's settlement on the Ohemmeng-abomma rivulet. These huts are inhabited throughout the year by two or three hunters, who supply Okwawu and Akem with smoked meat and fish. Occasionally an elephant is caught, and the ivory is sold at Okwawu for 4s. a pound. The hunters here readily disposed of their store of ivory to a caravan from Salaga, which was travelling coastward with slaves, sheep, and cloth.

On March 16th we reached a cross-road (Nkantanang) where the road to Krakye branches off to the north-east, whilst our path led to the north-westward. At noon we rested under a fan-palm on the Sumi (Subi), and two hours beyond we camped for the night.

On the 17th, much to our surprise, we reached the pleasant village of Nkaneku after a march of only an hour and a half. It is inhabited by fifty or sixty Asante, who are hunters, and were busy smoking the meat of the buffaloes which they had killed the day before. We here met with another caravan coming from Salaga. Its guides were two Fante Christians from Cape Coast Castle, who much scandalised us by alternately calling upon Allah and Christ. Such backslidings are by no means rare among the Fante, many of whom are said to have exchanged their superficial Christianity for Mohammedanism.

On March 18th we travelled westwards by way of Papasu, and late at night reached Sabuso, a small Asante hamlet.

On the 19th we arrived at Anyinaefi, a large Asante village with 2000 inhabitants. We were kindly received, but suffered much from the intense heat. Anyinaefi and a neighbouring village are in Asante, but are not subject to Kumase. The people were in a state of excitement because the trade route through Ateobu to Salaga had been stopped by the Dente priest of Krakye. A load of kola-nuts can be purchased in Okwawu for 6s., and sells at Salaga for 30s. At Ateobu caravans were required to pay a toll of 100 nuts per load, and this excited the cupidity of Dente, who ordered that kola-nuts should in future take the road through Krakye.

On the 20th we continued to travel leisurely towards Ateobu, preaching the Gospel as we went. A couple of hours brought us to the Sene, a large tributary of the Volta, where we saw antelopes, monkeys, and guinea-fowl, and observed traces of elephants. An hour and a half beyond we arrived at the Asante village, Nkubem ("under fan-palms"), where we encountered a deputation from Mampong, Nsutu, and other Asante towns on the way to Krakye, to whose fetish-priest they were about to submit themselves, in order that they might be permitted once more to trade with Salaga, which had been forbidden them since 1874. The leader of this caravan was an old acquaintance from Kumase, who had turned Mahommedan. When reproached with his change of religion, he smiled cunningly, as if he wanted to say that it did not matter as long as the change brought grist to his mill.

After two hours' march we reached Aberewangko, the first village in Atabuobu or Ateobu. We here found ourselves among quite another tribe, the Potoso or "barbarians" of the Chi, from whom they differ in physique, in language, and in the style of their houses. They speak Guang; but Chi and the Salaga dialect are also understood. Most of them were strongly built, and their cheeks bore incisions. A young man of athletic build, who at first looked threatening, became friendly when he heard that we intended to visit the king of Ateobu. The houses have roofs

with gabled ends, and are covered with grass, as in Akuapem. They are mostly built round a square yard. Walls and floors are bedaubed with a dark-coloured material, which hardens them.

Our road, on the 21st, still led over the scorching plain, but it took us past many well-kept plantations. Yams were planted in regular ridges, one man sometimes owning 800 or 1000 of these roots. Ground-nuts, rice, and a little maize were also cultivated, but the banana appeared to be almost unknown. We passed through Mmem ("among the palms") and Amamforo ("new town"), and after a march of three hours reached the outskirts of Ateobu, at 2 P.M. We sat down under a tree, and sent a messenger to announce our arrival to the king. The town was formerly much larger, and the ruins of many buildings still peeped out among the high grass which surrounded it. Its present population does not exceed 3000 souls. The style of the houses proved to be quite novel, for flat roofs had taken the place of the gabled roofs of Asante. The main street was planted with lofty shade-trees, and was lined with groups of from 20 to 30 homesteads, separated by open places. After keeping us waiting for a considerable time, we were summoned by the king's "speaker," and his swordbearer, into the royal presence. We found the king occupying the centre of a semicircle. Having shaken hands with him, as also with some of the chiefs, and with the king's mother (who sat on his right hand), we sat down, when the whole assembly filed past us. The king wore rings and a necklace of gold, a silk cloth was wound round his head, and his dress was of the Asante pattern, embroidered with silk. He readily granted permission to preach the "glad tidings" to his subjects. The house which Captain Lonsdale had occupied two years before was assigned us. We had scarcely made ourselves at home, when the king paid us a visit. Our present, consisting of a gay cloth, candles, matches, needles, and other trifles, was accepted with pleasure, although something more magnificent had evidently been expected.

The streets presented nothing remarkable. A brass basin, about 30 inches in diameter, was shown us, the rim of which was elaborately ornamented, and which was said to have fallen from the sky. The walls of the houses are made of wattle and daub. The roofs are flat, and covered with a foot of loam. As the wood used is very hard these houses last long. The walls are stained with the juice of a tree which is said to make them water-tight. The floor of the courtyard is covered with loam; a small hole in the centre communicates with a pit, eight feet deep, into which the rain drains off. The king's palace differs in no respect from the other houses, except that it is four or five feet higher. Most of its numerous rooms are very small; and the walls bear traces of a good old age. Yams and rice are the principal plants cultivated. Millet is also grown, and the beer made from it is very intoxicating when fermentation first sets in. Trofwe, a district four or five hours to the north-west, and Abease, 10 hours to the west, acknowledge the king of Ateobu. The whole of this region, from Nkoransa to the Volta in the east, is called Brong. The language is Guang, Brong (a dialect of Chi) being confined to Amanteng, to the south-west.

On Sunday, the 23rd, the king and his people attended divine service. The king supplied us daily with eight large dishes of fufu, besides which we received a parting gift of four sheep, a small tusk of ivory (weighing four pounds), and a large quantity of yams.

On March 24th we left Ateobu for Krakye. The road led through quite a number of villages, whose chiefs had gone some years ago to live at Krakye, and whom fear of Asante still kept away. The language spoken is Guang; the principal place is said to be Wease, perhaps identical with a small village, Prangwiase, through which we came. The country presents itself as a grassy plain, dotted over with stunted

trees, spending but little shade. The soil is fertile, and yams are generally cultivated. Lions are said to abound, but we never saw one, although we observed footprints of them and of leopards. At Primase we, for the first time, saw circular huts, ten or twelve feet in diameter, with wattle walls, five feet high, and high conical roofs, the tops of which bore an ornament, consisting of a bunch of grass stuck through an old pot, the bottom of which had been knocked out. The door is only four feet high, and the interior is very close. Cooking is usually carried on in the open air, under a round shed.

On March 28th we arrived at the Volta, which was very low, so that the rocks, which are usually hidden in September, rose above the water, and our ferrymen were obliged to use great caution in crossing. An exceptionally dirty road led from the bank up to the famous fetish-town of Krakye. Krakye is compactly built, and, including the neighbouring villages, counts from 5000 to 6000 inhabitants. The houses are circular, with conical straw roofs, and they are not arranged in streets, but squatted about in inextricable confusion. The only open space is near the house of the fetish-priest, and there all public meetings are held. The soil is rocky, consisting of a siliceous conglomerate, and although the town stands sixty feet above the river, the flood sometimes rises to within a short distance from it.

Krakye is a great trading centre, where the Mahommedans from Salaga, Hausa, and the far interior, meet the traders from the coast. Merchants are often delayed there for months. Others resort to the town in order to seek the advice of its famous fetish in cases of sickness, of family disputes, and so forth. The fetish (Dente or Odente) is kept in a cave, in a grove outside the town, and we neither saw it, nor Kwaker Sakyi, its priest, who, during our visit, was residing at his own town, Otareeso, a day's journey off. This priest is more powerful than Basamuna, the king. The confederation of Krakye now includes Boem, Akoroso (a town on the Volta), Turubo, Nchumuru, and Pae. In 1884 several towns of Asante joined it (see above). The fetish's oracular powers are called into requisition once a week. Of late it is said to have lost credit.

Kete, the market-place, about half a mile outside the town, presents a scene of much bustle. Slightly built huts or open arcades covered with grass do service as shops. The goods exposed include native cloth, Mahommedan clothing, pouches, sheaths, and other leather ware, plaited goods, knives, scissors, needles, thread, beads, corals, &c. Cowrie shells are the medium of exchange, and 1000 of them are the equivalent of a shilling. Mahommedans are numerous, and they are evidently the masters of the situation.

On March 31st we bade farewell to Krakye, and took the direction of Boem, the blue hills of which proved a strong attraction to travellers who had spent so many days in grassy plains. At noon we rested at Makokwaem; then crossed the Oti, the largest tributary of the Volta, and after having been eight hours and a half on the march reached Tuntumkrom.

On April 1st the road led through Western Boem. We crossed the Asuoko (Asukoko, "red river"), a rapid rivulet, after a march of four hours and a half, and an hour beyond it arrived at Akaneem, a large village, situated at the foot of the hills. The houses here were square with gabled grass roofs, as in Aquapem. The floors bore ornamental designs in red and white earth.

On April 2nd we ascended the hill on which the twin-city of Tapo is built. Tapo is famous for its fetish. Here, as also at Worawora, Chi has quite superseded the language proper of Boem. We ascended the top of the hill, which rises 40 feet above the town. The country is beautiful. The slopes of the ridges are sometimes very steep. Water is plentiful and the soil fertile. Yams, bananas, rice, maize,

millet, and ground-nuts are cultivated. The houses are as in Aquapem. In a court-yard here I saw for the first time an African "kitchener." It was made of loam, and resembled a longish box, with two round holes in the top for the pots and two openings at the side for feeding it with fuel.

The road down-hill led through plantations and past palm-groves. After two hours we reached Brankoro, a hamlet on the margin of the grassy plain, and on the main road, which we followed hence to Anum. On April 3rd we slept at Wurupong, the largest town in Nkonya, close to the hills. On April 4th we passed Nchumuru, where they were keeping the funeral obsequies of a chief who had died several years ago, and then continued to Kpando, a town in Efe (Ehwe). On April 5th we reached Angvôe, a large town; on April 6th, the Wusută villages, the chiefs of which had been carried off to Kumase in 1871, but many of whom returned in 1874; on April 9th we slept at Anum, near the Volta, and on the 13th we arrived at Aburi in Aquapem.

A Visit to Salaga in 1884.

The missionary party which visited Salaga in 1884 started from Anum, a missionary station to the east of the Volta, on January 16th. It included the Rev. J. Müller, Dr. E. Mähly, G. Zimmermann (a mechanic), and the Rev. David Asante, a native minister, born at Akropong in 1835, and trained at Basel 1857–62. Angvôe, a populous town in the Efe territory, was reached on the 18th, and Kpando, a large place, much frequented by Mahommedan slave-dealers, on the 19th. The people there keep cattle, as also a few horses and asses. On the same day the party crossed into Nkonya, a district extending eastward from the Volta, and covered for the most part with grass or bush. The greater part is lowland, but towards the eastern border the hills rise to a height of 2000 feet. Much of the land is fertile. Rice is grown on the Volta, and among the other products are yams, bananas, plantains, oranges, palm-oil, and timber. Goats, sheep, and poultry are kept. There are ten villages, with between 10,000 and 12,000 inhabitants. Guang is spoken. The "king" resides at Wurubito, a village off the main road. Nchumuru is the first village reached on coming from the south. Further north is Wurupong, a larger place, at the edge of the forest and at the foot of a magnificent table-mountain, dedicated to the fetish Sia, in whose honour a man is sacrificed every year. The two big fetish-drums are covered with leather made of monkey-skin and beaten with human shins.

On January 22nd, the party reached Gyeasekangkuma, a village in Boem, whose inhabitants were strikingly naked and filthy, only the older people wearing a few bits of bark-cloth. Borada, the capital of King Akpanya, was visited on the 23rd. It is built on the slope of a hill. Boem or Boe, the inhabitants of which are called Boefo (sing. Boëni), and speak a language distinct from Guang, Efe, or Chi, has thirty-seven villages, with between 20,000 and 30,000 inhabitants. That section of it which lies nearest to the Volta, is for the most part a low grass-land, but in the east the hills attain a considerable altitude, and there is much forest. Among the products are yams, rice, ground-nuts, bananas, plantains, and palm oil. The elephant, buffalo, and antelopes, are hunted. The houses are quadrangular and small. The inhabitants make cloth from the inner bark of the bofu-tree, which is cultivated by them. Iron implements are procured from the neighbouring districts of Sandrokofi, and Ayiripe or Likpe. Boem was, until 1874, subject to Asante, but the Okwawu-Dukomang, who acted as the mandatories of the king at Kumase, have been driven off or killed, and the country now forms part of the Krakye confederation.

On leaving Borada, the party travelled towards the north-west. At Worawora, a small town on a hill, Chi was found to have quite superseded the language of Boem

Having crossed the Asuoko ("red river") and the Oti, at the time 300 feet wide and only three or four feet deep, but a very considerable river during the rains, as might be judged from the flood-marks, 20 feet up the banks, the barren, treeless district of Krakye was reached, and on January 28th, the town of Krakye, situated on a ledge of rock near the Volta, which there winds among huge blocks of rock. The town has about 250 circular huts. Its stench and filth are indescribable, partly owing to the fact that the dead from all the country around are buried in a grove of trees near it. Seven years before this visit only bark-cloth was known, and the young people of both sexes dispensed with garments altogether, but on the present occasion even the children wore clothing, whilst the king and the fetish-priest were clad in velvets. In other respects, too, there has been some progress, and lights, which formerly were not permitted in the town, can now be freely used. Whether twins are still thrown into the Volta does not appear. The fetish-priest asserts that it was his fetish Dente who influenced the Queen of England to send General Wolseley to Kumase.

The country between Krakye and Salaga is for the most part a treeless steppe; at Krupi, the first village of Nta, however, many papao and butter-trees are seen. On February 2nd, Salaga was reached. As seen from a hill, about a couple of miles to the south, it presented itself as a row of houses, over a mile in length, overtopped by shade-trees and backed by hills. The environs are treeless, but maize and millet are cultivated. On approaching the town the olfactory nerves were unpleasantly assailed, for heaps of manure and refuse are permitted to accumulate in the streets. No wonder the Mahommedans cover their faces when they go abroad. Many of the houses were roofless, and the population had dwindled down to 10,000 souls. From ten to twenty circular huts enclosed within a wall of mud or a grass hedge form a homestead. Apart from the dwellings of wealthy merchants, the furniture consists of earthen pots, mats or skins, and now and then a box or a low stool. There are two unshapely mosques with flat roofs, as also some schools in which reading and writing are taught. The water in the wells is brackish, but good water can be obtained from a rivulet a couple of miles to the south. The food consists largely of fufu (pulp of yams), but rice, maize, millet, potatoes, milk and butter can also be procured, whilst beef, mutton, and goat's flesh are supplied by the local butchers at the rate of a pound for 200 cowries. Trade has largely departed from the town, and the slave trade has nearly ceased. Cattle are imported from the interior. Donkeys, are numerous, as also sheep, and there are a few horses. Pami, the king's residence, lies one hour to the south-east of Salaga.*

Dr. Mähly, the Rev. J. Müller, and Zimmermann left Salaga on February 6th,

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* In 1877, when D. Asante and Theophil Opoku visited Salaga, commerce still went on briskly, and the town had 20,000 inhabitants. Mosi supplied slaves, buffaloes, cattle, horses, asses, mules, sheep, poultry, and cotton stuffs; Gyamang cotton stuffs and gold dust; Tagyang ivory, soap, honey, coloured bark mats; Hausa woollens, carpets, silks, leather ware, sandals, slippers, corals, silver ware, iron pots, copper and brass ware, and Asante kola-nuts. Ostrich feathers, salt (from the coast), and various kinds of European merchandise, were likewise to be had in the market. During Opoku's stay above 800 slaves arrived from Mosi and Hausa, and readily found purchasers at from 20*s.* to 80*s.* a head. Tanners lived in the town, and turned out red, yellow, and blue leather; there were smiths, who made anything in copper, silver, or iron, from a razor to an iron pot; as also barbers, musicians, and minstrels. Even the blind found a useful occupation in basket-making, although many of them preferred the trade of a beggar. Cowries were worth double what they are on the coast. Phil. Buss, in 1878, found trade at a standstill, excepting the slave trade, which was going on briskly, owing to the war with Mosi.

1884, and embarking on the Volta at Akoroso, they descended that river to Kpong, whence they travelled by land, arriving at Aburi eighteen days after they had left Salaga.

David Asante, however, took a new road, inland. He started on February 17th, with a guide and two Christians for carriers, was ferried over the Daka at Kwadwobone, and reached Alfae (Adafae) in Nnawuru, the residence of the heir-apparent of the King of Pam, on the 19th.

Continuing his journey on the 20th, he arrived the day after on the upper Oti, which here separates Nta from Obooso (Booso). This river is navigable throughout the year. Having crossed it in a boat he arrived after a march of twelve hours at Kalende (in Chi: Kadene), the first village of Booso, and on the 23rd Kokrong, a place of some importance, frequented by merchants from Hausa (Marewa) and Sekye (Fufu), a district in the north, who here dispose of slaves, ivory, and antique coral ornaments. Grass mats are made here, and exported to Salaga. Siade, the capital of Achati-Booso, lies in the hills to the east; it is the seat of a powerful fetish, Bruku, and of King Agyeibiako. The country from Salaga to the foot of the hills is a grassy plain, with clumps of trees and denser woods along the banks of the rivulets. The soil is fertile, and produces yams, rice, maize, three kinds of guinea-corn (atoko, awi, and woha or anfoni), and millet.

On February 26th, D. Asante approached the hills and arrived at Dadeease, the capital of Adele-Booso, whose great fetish is Fruko. Lapoda, the chief-priest, was at the same time chief of the district. Chi is understood in this district, as it had formerly an Asante governor. On the 27th the road for four hours led up the hills, and past fearful gorges until the village Kpelewu, on the plateau, was reached. On the 29th Asante crossed the upper Asuoko, and on March 1st he arrived at Kpaleave, the first village of Akuba-Booso, where he waited ten days for guides. Starting once more on March 13th he passed Abosonkuro, the seat of Egyenkyi, the great fetish of Akuba, and reached Dwong, the capital of the country. Travelling for two more days through a hilly country, partly wooded, he arrived on March 15th at Kisibo, the first village of Akposo-Booso, where a serious attack of illness detained him until the 22nd.

Booso (Obooso, i.e. "Hill Land") includes Tangyang-Booso in the north, Achati or Bruku-Booso, Adele or Fruko-Booso, Turubo or Tribu-Booso (which is tributary to Krakye), Akabu and Akposo (in Chi: Apeso), in the south-east, which borders upon Ana (capital Atakpame) and Nojie (in Efe). Nta, a language allied to Guang, is spoken in Tagyang and Achati, but the other districts have distinct languages, which are neither dialects of Efe nor of Chi, although the latter is understood in some parts. David Asante describes Booso as a magnificent country, where the temperature is cool, rains frequent, and rivulets numerous. The forests are not as extensive as in Aquapem, and there is consequently less moisture. The principal rivers are the Daka, the Oti, the Asuoko ("red river") and the Abo or Daẽ, and they all flow to the Volta or Firaw.

The country is thinly peopled. The inhabitants are physically strong, but seven or eight people out of every ten are afflicted with goitre. The tribal cuts on the face are the same as among the Ntafo. In their habits the people are exceedingly dirty, and although they know how to make soap, they apparently never apply it to their persons. Children wear no clothing whatever; youths go naked until they are circumcised, when they take to wearing a cloth round the loins and an upper garment, whilst young maidens are content with a strip of banana fibres or a string of coral worn round the loins. In Akabu only married men wear clothing, which is provided by the wives, whilst bachelors go naked.

Coral ornaments are worn by men and women. The hair is either tied up in

the form of a stalk, or the head is shaved, leaving only a tuft of hair on the crown.

The huts are circular, with a hole to creep through. Each hut usually accommodates a whole family, the parents sleeping on a low earthen bench, covered with a bark mat, whilst the children repose on the bare ground in front. Fowls, and even sheep and goats, are admitted to this domicile. There are no courtyards or separate places for washing and cooking.

The women are treated well, the husband even assisting in housework. He dare not illtreat his wife, for fear of her leaving him, which is a serious matter, as wives are not given in marriage, but must be wooed and carried off by consent. Only the chiefs and the wealthier people have more than one wife.

Agriculture and the chase are the principal occupations. Fowls, sheep, and goats are kept, but very rarely cattle, although fine pastures abound. The people of Tagyang and Achati collect honey, which they sell at Salaga.

The women spin cotton, dye it with indigo, and weave it into cloth. Earthenware is made, as also are plaited baskets. Akabu is known for its mats made of strips of bark, or of the ribs of palm-fronds. Ironware is imported from Sandrokofi and Akpavu. The commerce is inconsiderable. European traders are quite unknown, for the "Brofo" who occasionally visit the country in order to exchange European manufactures for home-made cloth, ivory, or slaves, are negroes.

The fetish-worship is far less subtle than on the coast, but the poison-ordeal is frequently resorted to, and accounts for the small population. When a person dies a whole village sometimes submits to take an infusion of a poisonous bark, known as *odom*. Quarrels are settled by resorting to the same dangerous arbiter, thefts are discovered by it, babies who cry much are made to swallow the infusion, to prevent their growing up wicked, and parents who happen to lose several children in succession, take it in order that the cause of their affliction may be discovered.

The fetishes have quite recently come into discredit, for rumours have reached Adele and Akabu from Efe, affirming that a son had been born to God, who had forbidden all work on the Sabbath-day. At the same time quite a new class of priests, male and female, has arisen, who claim to prophesy by inspiration of God, and not of a fetish, and who have built themselves huts at the outskirts of the villages, where the credulous may consult them. One of this new order of priests claimed fellowship with David Asante.

On March 22nd, D. Asante left Kisibo, in Akposo, and reached Amanforo, the first village of Boem. On the 23rd he arrived at Bagoro, another town of Boem, finely perched on a sandstone rock. It was a large town before the Asante destroyed it. On the 24th the river Abo or Daë was crossed and Efe entered, the first village of which was Fle (Ewhle, Whli). Continuing the journey by way of Latei, Jokpei in Avatime, near which native Christians had built themselves a village, Jerusalem, occupied since 1884 as a missionary station, and Peki,* D. Asante arrived at Anum, near the Volta, on March 29th.

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* Peki occupies a valley to the east of Anum, and has fifty to sixty villages, with about 30,000 inhabitants. It is the head of a confederation, which includes the Efe territory bordering upon the Volta, with the towns of Angvôe and Kpando, and about sixty villages with a total population of 40,000 souls: the towns of Anum (5000 inhabitants) and Boso (2000), and Nkonya (10–12,000). Efe (spelt Ewhe by the missionaries) is called Hua or Huam in Chi, Ayigbe in Gã, and Krepe by the Europeans. Guang is spoken in Nkonya, Anum, and Boso. Avatime forms an enclave with a language peculiar to it.

A Last Note on Mont Everest.

By General J. T. Walker, C.B., late Surveyor-General of India.

In his interesting and discursive Further Notes on Mont Everest, in the March number of our 'Proceedings,' Mr. Freshfield combats the conclusion in my Notes in the February number that Hermann Schlagintweit's Gaurisankar is not Mont Everest. He does so on the ground that my argument was founded on erroneous premises, which I had credited with greater accuracy than they deserved. I took them from the well-known volumes of the Schlagintweits' 'India and High Asia' (1861–62). Mr. Freshfield's belief that they are untrustworthy is, I rather think, mainly founded on certain extracts and tracings from Hermann's original field books and drawings which he has recently received from Dr. Emil Schlagintweit, Hermann himself being no longer alive.

I have examined these extracts and tracings, and I readily admit that if they represent the bulk of Hermann's original data, my premises must have been derived to a much greater extent from eye observation and conjectural estimates of bearing and distance than from measures with instruments of precision, and cannot be trustworthy. But, though I am fully aware that the Schlagintweits' work in India is, as Mr. Freshfield remarks, "far from infallible," I cannot bring myself to believe that all the display of panoramic profile and detail of geographical position, which has been published as the results of their work in the Nepalese Himalayas, rests on so small and disproportionate a basis. What I questioned was the accuracy of Hermann's identifications of far-distant snow peaks. I am of opinion that no man—not even a member of the Alpine Club—can claim infallibility in his identifications; but geometrical profiles and determinations of position are other matters, and they may be made with all desirable accuracy by men of very modest scientific attainments, working honestly and taking pains. Thus I accept Hermann's geometry as sufficient for my purposes, but I impugn some of his identifications. Mr. Freshfield, on the other hand, accepts the identifications and impugns the geometry.

He suggests that the original panoramic profiles were eye sketches "corrected by more or less accurate measurements obtained with the theodolite." It may be so; but then they would scarcely have been published as true geometrical profiles, with the horizontal and vertical angles drawn to the scale which is given immediately below each profile; they may have been drawn on the spot, every peak of the sierra being projected on the paper immediately after measurement with the theodolite; this would be less troublesome and more exact than recording all the observations and drawing the profiles afterwards; it would explain the paucity of entries in the field books; and it is in accordance with the following description of the general procedure (vol. ii. p. 263):—

"In drawing these panoramas, a unity of linear measure was made to corre-

spond to a constant value of angular measure . . . Our drawing paper was always prepared beforehand and mounted on cloth. It was then carried as a roll, and the size required cut off upon the spot. . . Not hours only but days were consumed in drawing and painting a panorama of large size."

The observations of the Nepalese snow peaks were principally taken from Kaulia and Falut, two stations fixed by H. Schlagintweit by observations to surrounding snow peaks previously fixed by the Great Trigonometrical Survey. As regards Kaulia Mr. Freshfield remarks:—

"No observations fixing the exact geographical position of Khatmandu (or consequently of Kaulia) have as yet been published. These calculations, therefore, in so far as they are based on distances, rest on an uncertain foundation. Captain Montgomerie . . . . comments on H. Schlagintweit's failure to fix with precision the longitude of Khatmandu."

Here Mr. Freshfield has fallen into the very natural mistake of supposing there must be a connection between the position-determinations of Khatmandu and Kaulia; there ought to be, but there is not. An unsuccessful attempt was made to fix the position of Khatmandu by astronomical observations;* but, by some strange oversight, the much simpler and more accurate method of deducing the longitude from the triangulation connecting Kaulia and Khatmandu was neglected. This throws a doubt on the completeness of the work at Kaulia, of which I can find nothing in the published volumes. But, in the data supplied in manuscript to Mr. Freshfield, a magnetic bearing of Gaurisankar is given which, if correct, proves either that the position of Kaulia is erroneous, or that the peak pointed out to H. Schlagintweit as Gaurisankar was not Everest.†

Of the station Falut Mr. Freshfield says, very truly, that "in the first place we must know exactly where Phalut is," and he gives in a foot-note H. Schlagintweit's and three other position-determinations, all differing from each other; but they differ necessarily, because they refer to different points. One of these is the well-known hill of Sandakphu, on the Darjiling-Nepal frontier, whence the summits of the Everest and Makalu mountains are seen well apart; Makalu, however, being very much the most conspicuous object. The Falut station is fully nine miles from Sandakphu, and is situated on a ridge (Phalut) on which

* The observations and results are given in some detail. See Schlagintweit's vol. i. p. 197.

† The given magnetic bearing of Gaurisankar is .. .. 78° 16′
The magnetic declination, as contemporaneously determined at Khatmandu by himself is .. .. 2 36 E.

Thus the azimuth of Gaurisankar is .. .. 80° 52′

But if his position is correct, the azimuth of Everest is 82° 8′ as stated in my first notes. The difference between these values is 1° 16′, which is a larger error than is fairly attributable to the observations of bearing and declination.

The vertical angle measuring the apparent elevation of Gaurisankar at Kaulia would show conclusively whether Everest was observed, but unfortunately it is not given.

various points have been fixed by different persons. H. Schlagintweit says he lived in a tent near his station

"during three weeks, while occupied with physical observations and trigonometrical measurements of the snowy range. . . . As one of our principal panoramas is made from this peak, we think it advisable to give, exceptionally, some details of our trigonometrical measurements. . . . These values perfectly corroborate the distances introduced in the calculation, and, in consequence, the geographical co-ordinates we had obtained for Falut."—Vol. ii. p. 291.

Assuming them to be fairly correct—and his latitude and longitude can scarcely be erroneous by half a mile at most—the summit of Makalu must have stood almost exactly in the line between him and the summit of Everest, and at an elevation of about 1700 feet above that line, thus altogether eclipsing Everest. There can be no doubt that the prominent mountain which is represented in his chromo-lithograph under the name of Everest or Gaurisankar, has been wrongly identified, and is in reality Makalu, not Everest.*

The explanation is simple and readily intelligible to any one who is not biased by previous misconceptions, such as would be caused by the chromo-lithograph,† or by the idea that because Everest is the highest known mountain in the world, therefore its appearance must be of surpassing grandeur. Everest stands in a circle of giant peaks which greatly dwarf its appearance from all sides. Makalu, the highest of these peaks, has Everest on one side and nothing at all on the other; it towers majestically over the valley of the Arun at the stupendous elevation of 27,800 feet, and is by far the most prominent of the Nepalese mountains which are seen from the frontiers of Sikkim and Darjiling. Colonel Tanner says that :—

"With the exception of the Kinchinjinga peak, Makalu is the finest yet fixed in

* He resided at Falut during May and June 1855 (vol. ii. p. 57). The data of the G. T. Survey, of which he was then in possession (ii. p. 291), must have been restricted to the snow-peaks and other points in the Sikkim and Darjiling districts: for the data for the Nepal peaks were not published until the end of the year, when they seem to have been communicated to him for the first time (ii. p. 297). Thus, when at Falut, he must have been ignorant of the two rival peaks, and naturally he made the mistake of supposing Makalu to be Everest, as every one else has done until quite recently.

† The chromo was hung up for many years on a wall of the Surveyor-General's offices in Calcutta, where I constantly saw it, fully believing it to be a representation of the great mountain. It was not until I was correcting the proofs of my first notes on Mont Everest, and came to the passage specifying four of the principal surrounding peaks, that it suddenly dawned upon me that the mountain represented might really be Makalu, and a few calculations satisfied me that it must be. Thus the introduction of this important fact into my notes was an afterthought, and was done somewhat hurriedly that the publication of the monthly 'Proceedings' might not be delayed. There is an accidental omission of some importance which I take the present opportunity to rectify. The passage that "Makalu, though 1200 feet lower, has the greater apparent elevation," should be followed by "because of its closer proximity and the earth's curvature." Of the 1700 feet by which its summit eclipses that of Everest from Falut, about 1100 are due to curvature (less refraction), and the remainder to proximity.

the Eastern Himalayas; it stands apart from the Everest group and exposes a great mass of snow towards the Sandakphu ridge. From the south, in the plains of Bhagalpur and Parneah, it is the most striking object in the panorama of snow."

On the other hand he says of Everest that its outline "is rather tame than otherwise." He has travelled far and wide through both the Eastern and the Western Himalayas; he has recently taken observations to Everest with a powerful theodolite from some of the best points of view accessible to Europeans; and he is probably more familiar with the varied aspects of Himalayan scenery than any other man living.

Many persons have visited Darjiling and the eastern frontier of Nepal, in order to get a sight of the highest point yet discovered on the face of the earth, and they have, almost without exception, believed that they saw it in the most prominent object in their field of view. Only those who were aware of the existence of the gigantic Makalu have succeeded in differentiating the two mountains, and rightly appreciating each. From Darjiling and some other points to the east they are both visible, in close juxtaposition, but everywhere Makalu appears to be higher than the more distant Everest, as is shown in three out of the four profile-sketches appended to Mr. Freshfield's Notes, the exception being taken from H. Schlagintweit.*

Their positions were first fixed by observations taken by officers of the G.T. Survey during the months of November and December 1849, and January 1850, which were not reduced rigorously until the following summer recess. The results were not published until 1854. Thus in 1848, when Sir Joseph Hooker was making his memorable excursions into Sikkim and Nepal, Everest had not been discovered. But Sir Joseph mentions "a white mountain of stupendous elevation, called by his native people Tsungau," which he says is "the only mountain of the first class between Gosaintan, north-east of Katmandu, and Kinchinjunga." From some of his points of view he must have seen both Everest and Makalu; but there can be no doubt that the mass of stupendous elevation which everywhere formed the most prominent object in his field of view was Makalu, not Everest.

* Mr. Freshfield specially comments on the great peak (29,002) standing clear of its rival (27,799) in the profile sketch from the Tiger Hill station; but he also notices that "in official maps there is hardly half a degree difference between the bearings of Makalu and the great peak from Tiger Hill." The explanation is that the peaks are represented in the profile much magnified, as they appear through a telescope, and not as they appear to the unaided eye. Any one may convince himself of this who remembers that half a degree is somewhat less than the sun's apparent diameter, and notices that there is room for a row of many suns between the two peaks in the profile.

I once ascended Tiger Hill with Captain Harman when on a short visit to Darjiling; he pointed out the higher peak to me as Everest; a year afterwards he discovered that there had been a general delusion about Everest, and that the most prominent peak in our field of view was the summit of another mountain; he subsequently published the profile sketch which Mr. Freshfield has reproduced. Very little but the peak of either mountain is visible from Tiger Hill, because of great intervening ranges.

General Tennant, who was a member of Sir Andrew Waugh's committee on Hodgson's Deodangha, has not seen Everest, but is fully cognisant of the facts relating to its discovery. He writes—

"I have seen in the R.G.S. 'Proceedings' the sketch of the Himalayan peaks in Nepal by Schlagintweit, from Falut. It needs no more to prove that the peak shown there (I don't say who marked it at 29,002) is not Mont Everest. I remember Waugh's dwelling strongly on the fact that Mont Everest was a rounded top, nowhere conspicuous, and by no one suspected of being exceptionally high. It was found to be so on comparing the results of observation. Rays from a large number of stations were found to pass through one point and, on computing the triangles, to belong to one summit, and afterwards the observations of elevation were found to agree in giving the same height."

Thus it is clear that the discovery of the great pinnacle was not a revelation at first sight, but the result of slow and carefully elaborated processes of induction.

I now come to the main point at issue between Mr. Freshfield and myself:—Was Waugh justified in concluding that the pinnacle which he called Mont Everest had no known native name? We have seen that he convened a committee on the subject, and that they reported against the name Deodangha. But Mr. Freshfield objects to the committee, and challenges their conclusions. He remarks that Waugh

"Called—not on independent travellers such as Sir J. Hooker or Hermann Schlagintweit—. . but on five of the most eminent surveyors on his staff, to reply to Mr. Hodgson. . . . None of these officers appears to have been at Khatmandu, and the weight of their remarks seems to me to be further diminished by the fact that they were summoned not as impartial jurymen, but as subordinates to support their chief."

But we know that had Sir J. Hooker been interrogated, he would have replied that his native people called the mountain Tsungau; and had Hermann Schlagintweit been interrogated he would have replied that Rajah Jang Bahadur and several of his well-informed pandits had told him most positively that it was called Gaurisankar. This is surely not inconsistent with the verdict of the committee that it could not "be called Deodangha without risk of error," and that there was no satisfactory proof what was the native name of the mountain, if it had one.

The talented authoress of 'The Indian Alps, and how we crossed them' (Longmans, 1876), gives an admirable sketch, in colours, of a great mountain, which she calls "Deodunga or Mount Everest," as seen from a point on the Singhalila ridge a little to the north of Falut. She first saw it in the dawn of a morning when she had risen early to watch the daybreak. She says:—

"Beneath, at my very feet, lies a valley of desolation, hemmed in by a wall of micaceous and tempest-shattered peaks, and beetling crags, and above these an undulating sweep of crystal—the snowy range of Nepal—looking marvellously near, and with that terrible beauty of death-like repose which precedes sunrise, as it follows sunset. Whilst I stand alone, amidst this infinitude of Nature, the sun,

beginning to ascend on his triumphal car of crimson cloud, tips the highest pinnacle with an aerial glory. In an instant it dawned upon me that I was at last gazing on Mount Everest, the highest mountain in the world. I could not be mistaken. There it stood, like a stupendous barrier, shutting out the west."

A day or two afterwards, while journeying northwards and ascending still higher, the mountain was for a while hid from view "behind a jutting rock." She thus describes the effect produced on her attendants when it again burst into view—

"Suddenly there is a loud and simultaneous exclamation of 'Deodunga! Deodunga! Gaurisankar!' from my attendants, all apostrophising it in their different dialects, as the magnificent spires of Mount Everest again burst unexpectedly upon the view."

Mr. Freshfield, quoting the latter passage, asks "Is this fact, or feminine fiction?" somewhat ungallantly, and leaves his question unanswered. I reply, Fact, unhesitatingly. The lady had indeed mistaken Makalu for Everest, as almost every traveller before and after her has done; but that is no reason why she should have misunderstood the exclamations of her attendants, or put words into their mouths which they did not utter. That they shouted "Deodunga! Gaurisankar!" is an indication that they were probably invoking the gods of their respective mythologies, and not merely proclaiming the names of the glorious mountain for the information of the English lady. The mountain is doubtless associated in some way with their gods; but the association is certainly not restricted to it, but embraces a congeries of mountains, and may possibly extend over the entire Nepalese Himalaya between the Bhotia-Kosi and the Arun rivers. Dévadhúnga * and Gaurisankar would seem to be generic and not specific names, applying to a group, not to an individual. It is not at all improbable that the seven other names contributed by Hodgson and H. Schlagintweit to the literature of this subject, viz. Bhairab-than, Bhairab-langur, Nyanam, Chingopámari, Gualham, Tangla, Gualham-tangla, and Sir Joseph Hooker's Tsungau, and also Colonel Tanner's Makalu—which I have employed throughout, merely because more rhythmic than "No. XIII.," the Survey designation—may each and all be generic and not specific.

One word more. Mr. Freshfield "joins issue directly" on the designation Mont Everest, which he rightly calls "a curious hybrid." I defend the hybrid. The French word 'mont' means a single elevated mass, great or little, as distinguished from 'montagne,' which means a congeries of such masses, if we may accept the authority of Littré's *Dictionnaire de la Langue Française*, in which *montagne = suite de monts qui tiennent l'un à l'autre;* the English 'mount' is not equally distinctive, being not unfrequently employed as an abbreviation of 'mountain,' and a mountain may be many-headed. Waugh's object was to show that he was naming the great pinnacle itself, and not the masses of which it is the culminating point. He employed the prefix

* This is the strict spelling, not Deodangha or Deodunga.

which he thought most suitable for this purpose; and, with all due deference to literary purists, I submit that a hybrid which conveys a distinct and definite meaning is preferable to a purism which does not. A more valid objection is that 'mont' is so similar to 'mount' that an Englishman might not readily appreciate the distinction, and would be liable to adopt the English instead of the French prefix. I must confess that I myself have done so, and that I had long forgotten Waugh's prefix until it was recently brought to my recollection by General Tennant.

But the matter of present importance is the name itself, not the prefix. The great pinnacle may possibly be found hereafter to have a native appellation, applying to itself only, and to nothing else. I think that until then geographers cannot do better than follow the advice of the late eminent President of the Royal Geographical Society, Sir Roderick Murchison, and allow it to continue to bear the name of Everest.

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*The Keeling Islands.**

Mr. E. W. Birch was deputed in August last year by the officer administering the Government of the Straits Settlements, to visit and report on the Cocos or Keeling Islands, which are now attached to the government of that colony. Mr. Birch's report forms a valuable addition to the information concerning this interesting group contained in Mr. H. O. Forbes's 'Naturalist's Wanderings in the Eastern Archipelago.' He embarked on board H.M.S. *Espoir*, Lieutenant and Commander Horace R. Adams, R.N., on August 10, 1885, and reached the islands on the 20th. The ship entered between Horsburgh Island and Direction Island, and anchored in the lagoon, in between five and six fathoms. Ships drawing not more than 20 feet of water can easily enter and occupy this anchorage. The islands present a much larger appearance, Mr. Birch states, than a cursory glance at the chart in Mr. Forbes's book would lead one to expect. The general appearance he describes in the words of the Rev. E. C. Spicer, a naturalist who obtained a passage in the *Espoir* from Batavia to the Islands.

"The group of coral islands, called the Cocos, form a roughly broken circle nearly approaching the horse-shoe shape common to coral atolls. The islands are of varying size, some being from one to seven miles in length, and others a few hundred yards, while the smallest are simply mounds of coral sand, crowned by a few coco-nut palms. They are connected under very shallow water by the hard cement rock on which they rest, and which is formed by the disintegration, through the blows of the heavy surf, of an enormous quantity of corals and marine shells. Outside the islands, and nearly all round the group, a natural barrier protects the lagoon, and seawards of this bar there is a sudden slope into very deep water. The appearance of the exterior and of the interior of the islands is strikingly different. Towards the ocean the heavy surf breaks over the jagged rocks and washes large pieces ashore. The interior shores are quietly washed by a clear green shallow sea, and the smooth sandy beach forms a pleasant contrast to the green vegetation above it. The circle of the islands bounds a lagoon for the most part of very shallow water, with pits of varying depth. The land is evidently rising, and at some distant time will form a circular island surrounded by a crater-like edge. The resemblance of the whole to a giant crater is very striking."

* For map *vide* 'Proceedings' 1879, p. 816.

The islands are over 20 in number, for the most part very narrow, and without any exception, are thickly planted with coco-nut palms. The beach is covered with pumice-stone, which was washed ashore some five months or so after the Krakatoa eruption in August 1883. The sand is the whitest and finest Mr. Birch has ever seen, and under the microscope shows the most minute shelly particles. During the terrible and devastating cyclone of 1875, Mr. Birch states, three aneroids went past the lowest mark and stuck, the mercurials being dashed against the wall and broken.

Mr. Birch gives a detailed account of the various members of the Ross family, and a history of their connection with the islands. One object of his visit was in connection with an application which the head of the family had made, in order that a telegraph cable might be laid for the purpose of connecting the islands with Batavia. In 1857, shortly after J. G. Clunies-Ross succeeded his father, the original settler in the islands, they were visited by H.M.S. *Juno*, Captain Fremantle, who formally took possession of the group in the name of the British Government.

The population of the islands is divided into two classes:—(*a*) Keeling-born Malays, and (*b*) Imported coolies from Bantam (Java). It is the policy of the Ross family to reduce gradually the number of imported coolies, but they encourage the permanent settlement of these coolies in the islands. The following figures show that the population is on the increase:—

	Keeling-born.	Bantamese.	Total.
1874	292	198	490
1880	310	125	435
1885	377	139	516

Contrary to the usual Malay custom, the Keeling islanders are at liberty to choose their own wives. There have been 158 births since January 1, 1880, and only 57 deaths, 35 of the latter resulting from beri-beri. Monogamy is compulsory.

The exports are copra, coco-nuts, coco-nut oil, bêche-de-mer and menkudu (a bark used for dyeing purposes). From October 1882 to the end of 1884, 1527 tons of copra were exported, at an average price of 19*l.* per ton. Close upon eleven million nuts were used to make this quantity. The imports are mainly provisions and clothes. All provisions come from Batavia. In 1885, for the first time, the Ross family imported about 5000*l.* worth of goods from London. The trade is entirely in the hands of the Ross family. The principal imported article of consumption is rice. The seas around the islands literally teem with fish, and the natives are most expert boatmen and fishermen. They use the large and small nets, known to Malays in the Straits, but their chief skill lies in harpooning. All the islands are thickly planted with coco-nuts. In the Settlement and West Islands the space between the trees is kept clear, and the appearance is more that of a plantation; but in the other islands all the nuts, leaves, and rubbish are allowed to accumulate. Two or three times a year a working party goes over, picks up and husks all the nuts, and then leaves the refuse, sometimes burning it. The rotting away of all this rubbish, which is assisted by the working of small ants, forms a good manure for the trees. There is an ample supply of fresh water in the islands, and ships occasionally call to lay in a stock.

The imported Bantamese coolies send to Batavia for their wives, as no Keeling-born women will intermarry with them. At stated periods, the Ross family send to Batavia for such a supply of women as are required; on their arrival, the Bantamese applicants for wives make their choice, and the marriage is duly celebrated and registered.

The temperature of the islands is wonderfully equable. From the records kept during 1874 (1884?) the two lowest temperatures were 72° (in September) and 77° in January and March; while the two highest were 84°, in April, and 86° in February. The south-east monsoon is considered the coolest and healthiest time

of the year, the months of June, July, and August being considered the best. They are accompanied by fresh breezes and frequent rains, and Mr. Birch describes the weather he experienced as delightful. September, October, and November are very dry; winds are very variable, and beri-beri and diarrhœa are feared during these months. December, January, and February are looked upon as the cyclone months; they are very stormy and treacherous (especially December), fine days being followed by ugly weather, and *vice versâ*. The weather experienced in March, April, and May is said to be much the same as that of September, October, and November.

The Keeling-born men are fine specimens of Malays, being muscular and hardy. The women are a remarkably nice-looking lot, dressing well and carrying themselves very upright. Many of the natives eat with knife, fork, and spoon. They have mattresses and curtained beds spotlessly clean; they spread white table-cloths on their tables, use a brush and comb, have little ornaments for their tables, and decorate the insides of their homes with cuttings from illustrated papers, and cartoons from *Vanity Fair*. The houses are much better built than Malay houses in the Straits. The language spoken in the islands differs in many words from the Malay in the Straits, though it is easy for one who knows Malay to make himself understood. The curious custom prevails here, which, we believe, is found among other semi-civilised and uncivilised people. When a man becomes the father of a son, he is no longer called by his own name, but by that of his eldest son, with the prefix *Pa* to it. Poultry is plentiful in the islands; in Horsburgh Island are 30 or 40 deer, originally brought from Java and Sumatra, and about 30 sheep in Settlement Island. Rabbits have also been introduced into Horsburgh Island, and a pretty grey and brown speckled species of landrail abounds. Jungle fowl are found in most of the larger islands. Many varieties of vegetables and fruit trees found in the Straits flourish in the islands. There is one species of banana which, according to the Rosses, is peculiar to the islands. Mr. Birch gives the native names of twelve useful woods. He visited many of the smaller islands, which, according to his statement, are gradually becoming connected. Captain Adams took some twenty photographic views and groups. In the Report and appendix, Mr. Birch gives much information on the administration of the islands by the Ross family, and several documents bearing on this subject and the annexation of the islands by Great Britain.

GEOGRAPHICAL NOTES.

Mr. J. F. Needham's Journey to the Zayul Chu.—The following account of Mr. Needham's recent journey, so important from its disproving the imagined connection between the Sanpo and the Irawadi, is contained in a letter addressed by Mr. Needham to Colonel Haig of the Indian Survey and communicated to us by General J. T. Walker:—"Having read A—k's journal and subsequently an article in the *Pioneer* of the 16th May, 1885, headed 'The Rival Rivers,' where mention is made of a paper read by Mr. R. Gordon before the Geographical Society, in which, after discrediting A—k's theory that the Sanpo breaks away south at Gya-la-Sindong and eventually falls into the Brahmaputra under the name of the Dihong, he sub-

stitutes one of his own, viz. that instead of its turning south where A—k alleges it does, it runs for many miles further to the eastward and then breaking away south (somewhere west of Rima) joins the Irawadi, I solicited permission to endeavour to reach Rima. This having been given, I left Sadiya on the 12th December, 1885, in company with an influential Khampti chief who speaks Digaru fluently, and who some ten years ago endeavoured to make the trip, but was compelled to return when within a few miles of Rima. I took no escort, but ten Frontier Police (unarmed) were allowed to accompany me as orderlies, and Captain Molesworth (the Frontier Police Commandant) joined as my guest.—I got safely through the Digaru and Miju Mishmi countries, and on the 4th January was in sight of Rima, when the Governor ordered me to be stopped, and as I was refused supplies and was otherwise treated uncivilly, I was compelled to retrace my steps. It was a grievous disappointment to me to be refused admittance to Rima, but having succeeded in getting in sight of it, the disappointment was not so keen as it might have been, for I was in the proud position of being able to refute Mr. Gordon's theory (which I had all along considered to be erroneous), as also to very materially corroborate A—k.—I marched up alongside of the Brahmaputra the whole way from Sadiya to within sight of Rima, and I can consequently positively assert that no river as large or anything like as large as the Sanpo flows to the southward anywhere on this side of that place. When in sight of Rima I saw a river coming down from the north-east and flowing into the Brahmaputra below Rima, which I have no doubt whatever is the Zayul Chu and that it is correctly shown in A—k's map,* and I was informed by trustworthy Miju chiefs (who visit Rima constantly) that the Brahmaputra (known to them as the Lôpani) flows down from some mountains fifteen days or so distant from Rima, and I saw it flowing from the north-west just below Rima, exactly as marked in A—k's map.—From the evidence I got on the spot, I have no doubt whatever that the Brahmaputra takes its rise in the mountains to the south of the Nagong Chu river (*vide* A—k's map), and that it is known to the Tibetans under the name of the Kongthod Chu, as marked in the same map. I was twenty-four days reaching the spot near Rima, but did the return journey in sixteen days. On my way there I was delayed somewhat in interviewing the several chiefs through whose country I had to pass. I took no observations, but carefully noted the bearings of the road or path daily, and made as careful a calculation of the distance as was possible. I made the distance to Rima to be 184 miles. The Tibetan village of Samê is on the right bank of the Brahmaputra, about three miles or so west of Rima. Prun (which is the name of a Miju clan), the furthest point reached by Mr. T. T. Cooper, is about 55 miles west of Rima."

* Vide 'Proceedings,' 1885, p. 136.

The Trans-Caspian Railway.—At a recent meeting of the Geographical Society of Paris a communication (dated 30th December, 1885) was read from General Annenkof, chief director of the extension works of this railway, with regard to its present position and future progress. In April last it was decided to continue the railway from Kizil-Arvat to the Amu-daria viâ Merv. Surveys were made, and the route mapped out as far as the last-named place. It then became a question whether the line should proceed to Chardjui or Burdalyk on the Amu-daria, in view of its possible prolongation to Samarkand. Further explorations were therefore made in both directions, resulting in the choice of the Chardjui route. From Kizil-Arvat the line runs in an E.S.E. direction parallel to the Kopeth-Dagh Mountains on the Persian frontier, traversing the oasis of Akhal and passing under the walls of Geok-Tepe. Askhabad, the most important station along this part of the line, is about 135 miles from Kizil-Arvat. Leaving Askhabad the route lies through a fertile country, past the villages of Ghiaurs, Lutfabad, and Kaahka to Duchak, where it bends to the E.N.E. and enters the desert in the direction of Merv. Near the village of Karry-Bend (32 miles from Duchak) the line crosses the Hari-Rud by a bridge about 100 yards long. From the Hari-Rud to the Murghab, a distance of 78 miles, the railway will traverse a desert until the Merv oasis is reached. Passing through Merv it will again enter the desert extending as far as Chardjui, which is 118 miles from Merv. This is by far the most difficult part of the route, owing to lack of water. The wells, which are few and far between, afford but a very limited supply, and that in some instances is salt. Another serious obstacle is the moving sand, which would, unless preventive measures were adopted, quickly block the line. It is thought, however, that by means of plantations along the line, similar to those in Algeria, the difficulty may be got over, and nurseries have been established near some of the principal stations with this object.—On the 10th December the service as far as Askhabad was opened, and on the 30th December a further portion of the line as far as Ghiaurs was ready for traffic. From Ghiaurs to Merv the necessary earthworks have been completed, and the bridges and stations are in course of erection. This part of the line would probably be opened in the spring. Along the remainder of the route no actual work had been commenced, but at the other end of the railway a short extension was being made to another point on the Bay of Mikhailovsk, in order to secure a deeper anchorage for the large vessels from Astrakhan. The total length of the railway from Mikhailovsk on the Caspian to Chardjui on the Amu-daria will be 662 miles.

Afghan Boundary Commission.—The latest particulars respecting the survey work of the Afghan Boundary Commission are to be gathered from an interesting letter from its correspondent, published by the *Pioneer* newspaper, dated Chahar-shambeh, January 23rd. Major

Holdich, Captains Gore and the Hon. M. G. Talbot and Sirdar Mahomed Aslam Khan, were then at Daulatabad and Andkhui completing the survey of the country up to the Oxus, in readiness for the demarcation of that part of the frontier by the Commissioners in the spring. Three Russian topographers and Captain Peacocke had been at work for a month or so on the portion between Maruchak and Almar, 16 miles to the west of Maimana, and Major Holdich and his party were to take up the survey of the remainder on to the Oxus. Till the completion of that survey nothing could well be done, as the country north of the high road from Chahar-shambeh to Andkhui is almost unknown. Survey work was to go on whenever practicable, all through the winter, but fog and mist had greatly hindered operations. Captain Peacocke last year carried his reconnaissance right across the *chul* or desert from Maruchak to Andkhui in the height of winter in terrible weather, he and Mr. Merk having been overtaken by one of the worst snowstorms of the year. Chahar-shambeh (mentioned by Grodekof in his ride to Herat) is described as a valley about half a mile in width between the low hills bordering the chul on the north, and the grand snowy range of the Tirband-i-Turkestan some distance to the south. The Usbegs are a poor uninteresting race, with anything but a fighting look about them, though they held out at Maimana for a long time against the Afghans, and there are many tales of their individual courage against the Turkomans. The officers of the mission appeared to anticipate that all the necessary surveys would be finished by the end of March, and that by the end of the following month the demarcation of the frontier would be in a fair way towards completion.

Ethnographical Map of Asia.—Herr Vinzenz von Haardt, the well-known cartographer to Hölzel's Vienna establishment, is about to publish by subscription an ethnographical map of Asia, for which he has been collecting materials for many years. It is only part of a larger scheme which will include similar maps of all the great divisions of the world. The map will be about 6½ feet wide by 4½ feet high. It will show the localities of 136 divisions of peoples and languages in twenty-six tints of colour and shading. Herr von Haardt has consulted all the best original authorities for his materials, and follows the systematic arrangement of Dr. Friedrich von Müller. The value of such a work both to geography and ethnology is evident, and it deserves encouragement.

Mr. H. O. Forbes.—Mr. Forbes has sent us a chart of the south-eastern part of New Guinea, on which he has marked the track of the vessel in which he accompanied the late Sir Peter Scratchley last November, on a tour of inspection along the whole northern coast under British Protection as far as the German boundary. The party landed at various points and were well received by the natives, and several small rivers were discovered. They walked across the peninsula of East Cape from the southern to the northern shore. Mr. Forbes intends

to remain in camp at Sogere near Port Moresby until the commencement of the dry season, when he will make an attempt to reach the summit of the Stanley range.

Exploration of New Guinea.—The German expedition which we announced in our February number (p. 101), left Berlin at the end of January on their way, viâ Batavia, to Cooktown in Queensland, whence they will be taken by a steamer of the German New Guinea Company to Finsch Harbour, in Kaiser Wilhelm Land. The expedition is expected to be at work for two years. It consists of an astronomer and geographer, Herr Schrader of Hamburg, a botanist, Herr Hallrung of Dresden, and a geologist, Herr Schneider of Breslau.—A Dutch expedition, partly supported by the Government, is expected to leave Holland in July for the exploration of Dutch New Guinea.

Variations in level of the Black Sea.—As the Black Sea may be regarded as essentially an inland sea, scarcely subject to tidal action, it is possible to measure slight variations of level which it would be difficult to detect in the open ocean. On the basis of from 8 to 10 years' water-mark measurements at eight stations on the north and east coasts, E. von Meydell has succeeded in establishing a yearly period in the variations of level, as well as special irregular variations, extending over several years. The results are given in *Naturforscher* of February 27th. At all the stations the yearly curve shows in May or June an unmistakable maximum of from 9 to 17 centimetres over mean water-level. In summer the surface sinks gradually so that in July and August the mean annual level is reached. In October and February two minima are noticed, of from 6 to 10 centimetres below the mean level, divided by a secondary maximum in December, which is, however, still below the mean level. Although at all stations the curve of water-level is essentially parallel, still a few peculiarities are shown. The maximum water-level is attained at all stations near the mouth of a great river in the middle of May, and at the other, in the beginning of June. Herr von Meydell finds the origin of these variations in the great rivers of Southern Russia and the Danube. These are in high flood in spring in consequence of the melting of the snow in the broad plains of Hungary; the flood affecting their middle course in the end of April and their lower course in May. To these spring floods the greater part (72 per cent. at Moscow) of the snow and rainfall in the cold season contributes, while in the summer half-year only a small part of the rainfall (19 per cent. at Moscow) finds its way into the rivers. There exists a slope of the water-level starting from the mouths of the great rivers, so that, for example, in May at Otchakoff, at the mouth of the Dnieper, the surface level is seven centimetres higher above the mean level than at Odessa and Sebastopol. There are besides variations in the mean yearly level. From 1874 to 1879 the mean level of the sea rose from 19 to 36 centimetres, sank in 1880, in 1881 rose a second time to a maximum, which in 1882 was followed by a minimum. If we compare these variations in

the amount of water in the Black Sea with the deposits in the basins of the Russian rivers, it is seen that in those years when the water-level reaches its maximum, the rainfall in Central and Southern Russia is greatest.

Altitude of Russian Lakes.—General Tillo has published the results of new and more precise levellings made in order to ascertain the heights above the sea of lakes Ladoga, Onega, and Ilmen. Their respective heights above the average level of the Gulf of Finland appears to be only 16, 115, and 59 feet respectively, with a probable error not exceeding 1·5 feet. The formerly accepted heights were 59, 237, and 157 feet.

Further Explorations in the Congo Basin.—In a letter dated Stanley Pool, 30th January, Mr. Grenfell informs us that Lieutenants Kund and Tappenbeck of the German Expedition, had struck inland from Stanley Pool, in a southerly direction, early in August last, and returned to Leopoldville on January 27th. They crossed the Quango to the south of Kikunji, then several of the affluents which fall into the Bolombo river, then across the Bolombo or Sankuru, and northward to the Lukenje, where they made canoes and came down stream into Stanley's Mfini, reaching Kwamouth in eleven days. In *Le Mouvement Géographique* for March 21st, M. Wauters gives some further details of this journey; among other things it is stated that Lieutenants Kund and Tappenbeck have discovered a new river, the Ikata, which, according to M. Wauters, is the upper course of the Mfini. But to understand what has been done, further details must be waited for.

A New U.S. State.—The United States Senate issued a decree on February 7th, by which Dacota Territory is erected into a State—the thirty-ninth. The present territory of Dacota is divided under the 46th parallel, the south half becoming the State referred to, while the northern section will be known as Lincoln Territory. In 1880 Dacota had a population of 135,177, but since, in November 1884, the number of electors who voted was 86,764, the population must have greatly increased.

The German Census.—The following are the preliminary results of the Census of Prussia, taken on December 1st, 1885 :—

	1885.	1880.
East Prussia ..	1,958,858	1,933,936
West Prussia ..	1,407,960	1,405,898
Berlin district	1,315,547	1,122,330
Brandenburg	2,342,528	2,266,825
Pomerania ..	1,505,795	1,540,034
Posen	1,715,024	1,703,397
Silesia	4,111,411	4,007,925
Saxony	2,427,968	2,312,007
Schleswig-Holstein ..	1,150,233	1,127,149
Hanover ..	2,172,294	2,120,168
Westphalia ..	2,202,737	2,043,442
Hesse-Nassau	1,592,162	1,554,376
Rhine Province	4,344,806	4,074,000
Hohenzollern	66,709	67,024
Total	28,314,032	27,279,111

There has thus in the five years 1880–5 been an increase in all the provinces except Pomerania and Hohenzollern. The total increase has been 1,034,921, or at the rate of 0·758 per cent. per annum. In the previous census, the increase was found to be at the rate of 1·14 per cent. per annum in 1875–80.

Geographical Exhibition at Nantes.—An Exhibition of Commercial

Geography has been arranged for at Nantes by the Geographical Society of that city, to be opened on June 10th next and closed on August 15th. It will be arranged under five sections:—Scientific Geography, Ethnography, Travels and Means of Communication, Natural and Commercial Products of the West and of the Colonies, Educational Exhibition. Intending exhibitors should communicate with the Secretary of the Society.

The Manchester and Scottish Geographical Societies.—Under the auspices of the Manchester Geographical Society, our collection of appliances used in geographical education was opened in Manchester on March 16th. A series of lectures has been arranged for during the time that the exhibition remains open. The Scottish Geographical Society, again, is endeavouring to promote geographical education in the northern part of the kingdom, by offering a series of awards, embracing all classes of schools, and covering a wide field of subjects.

Portraits of Travellers.—The indefatigable Librarian of the Paris Geographical Society, Mr. James Jackson, has for some time been collecting photographs of travellers and geographers of all nationalities. The result is a collection of something like 2400 portraits arranged in a series of albums, which it is a great pleasure for the visitor to inspect. Such a collection is, moreover, of much utility, and therefore Mr. Jackson has done an additional service in issuing a 'Catalogue des Portraits de Voyageurs et de Géographes qui se trouvent dans les Albums de la Société de Géographie à la date du 22 Novembre, 1885.'

REPORT OF THE EVENING MEETINGS, SESSION 1885–6.

Seventh Meeting, 22*nd February*, 1886.—The Most Hon. the MARQUIS OF LORNE, K.T., President, in the Chair.

ELECTIONS—*George Wilson Dawes, Esq.; J. Willis Dixon, Esq.; Charles Bernard Durkin, Esq.; William Hole, Esq.; The Rev. T. W. Jex-Blake*, D.D.; *Capt. Gerald Ward Martin*, I.A.; *Rev. F. B. N. Norman-Lee; William Harold Tottie, Esq.*

PRESENTATION—*Robert Williams, Esq.*

The paper read was:—

"A Journey in South-western China, from Ssŭ-chuan to Western Yunnan." By Alexander Hosie, Esq., H.M. Consular Service, China.

Will be published in the next number of the 'Proceedings.'

Eighth Meeting, 8*th March*, 1886.—The Most Hon. the MARQUIS OF LORNE, K.T., President, in the Chair.

ELECTIONS—*Arthur Alcock, Esq.; A. Alexander, Esq.; Ernest Geo. Lennox Berkeley, Esq.; Thomas Bickle Ellery, Esq.; David Gowans, Esq.; Major-General Malcolm N. Haig; J. Harrington, Esq.; Henry Morris, Esq.; Carl Albert Thimm, Esq.; Alfred St. Johnston, Esq.; Joseph Wrigley, Esq.*

The paper read was:—

"A Journey through the Kalahari Desert." By G. A. Farini, Esq.

Will be published in a subsequent number of the 'Proceedings.'

Ninth Meeting, 22nd March, 1886.—The Most Hon. the MARQUIS OF LORNE, K.T., President, in the Chair.

ELECTIONS—*F. S. A. Bourne, Esq.; Rev. Wm. Campbell; Frederick Elder, Esq.; Halford Jno. Mackinder, Esq.*, B.A.; *Rev. J. Richardson; Claude Vincent, Esq.; Edward Montague Earle Welby, Esq.*

PRESENTATION—*Major G. L. Cuming.*

The paper read was:—

"Burma: the Country and the People." By J. Annan Bryce, Esq.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—February 5th, 1886: M. A. GERMAIN in the Chair.—The Topographical Service of the Army presented a copy of the Government map of Annam in 12 sheets.—General Annenkof addressed a letter, accompanied by a map, giving information regarding the Transcaspian Railway and the districts through which it passes.—A communication was read from M. H. Duveyrier on the value of longitudes in the Tunisian Sahara and the eastern part of the Algerian Sahara. In the former district, he said that up to the present time no longitude had been properly determined by astronomical calculations.—M. G. Marcel, of the National Library, made a statement with regard to some ancient maps of Africa by D'Anville. M. Merée had said at a previous meeting that the National Library did not possess a certain map of D'Anville dated 1751; M. Marcel stated that, on the contrary, the original manuscript of this map would be found in the Library, as well as many others by D'Anville.—M. A. Thouar transmitted a report giving the chief results of his expedition along the Pilcomayo.—M. R. du Caillaud forwarded a letter from Father Verins, a missionary in New Guinea, which gave an account of a short excursion he had made from his station near Hall Sound up the river Hilda as far as the village of Bioto, where he had met with a most cordial reception from the natives.—The attention of the Society was drawn by M. Venukoff to the geological map of Russian Turkistan, published in 6 sheets by MM. Romanovsky and Mushketoff. This map, he said, showed particularly the ancient and modern glaciers, the mines, and the altitudes of the most important points in the country.—In conclusion, M. Georges Demanche read a paper on the Canadian Pacific Railway, with notes on Manitoba and the Indians of the North-west.

——— February 19th, 1886: M. A. GERMAIN in the Chair.—Among the works presented were a Colonial Atlas published by M. Ch. Bayle, and a volume by M. H. Gaidoz, entitled 'Frances d'Outre-Mer.'—M. Mich. Venukoff forwarded some notes regarding geography in Russia. According to the latest researches of General Tillo, the level of the Baltic Sea is not everywhere the same. At Torneo in the northern part of the Gulf of Bothnia and at Cronstadt, the level is more than 3½ feet above the Bay of Kiel. M. Venukoff announced the approaching departure of M. Federoff upon a geographical and geological exploration of the northern part of the Ural Mountains, and forwarded a copy of a work by Professor Beketoff, of the University of St. Petersburg, giving the results of his researches on the flora of the province of Archangel, and containing an interesting preface on the physical geography of the country. The publication of the large Geographical and Statistical Dictionary of the Russian Empire was stated to have been completed, but the Geographical Society of Russia proposed to add another volume, containing articles on the countries annexed by Russia during the last twenty years, or since the dictionary was first commenced.—

Two letters were read from M. P. Lessar, dated December 30th and January 11th, 1886, from Meruchak, regarding the delimitation of the Afghan-Russian frontier. This, he said, had proceeded with such rapidity that he had had no leisure to make any scientific excursions. The frontier line between Zulfagar and Meruchak had been settled in six weeks, and he hoped that the second part of the work, viz. the boundary line between the Murghab and the Oxus, would be determined by the end of April. He intended to visit that district about the end of January, and would communicate to the Society any information he might be able to obtain regarding this little-known region.—Dr. Harmand, French Consul at Calcutta, forwarded a copy of a telegram addressed to *The Englishman* by one of its correspondents, with reference to a short expedition made by Mr. Needham and Captain Molesworth up the Brahmaputra from Sadiya to Rima.—M. R. du Caillaud made some observations with reference to an article just published by him in *L'Univers* on Sheikh-Said. He was of opinion that France could take possession of this important strategic position at comparatively small expense and without international complications.—A letter was read from Mr. Cope Whitehouse, dated 5th February, 1886, from Medinet-el-Fayum, announcing the arrival of Dr. Schweinfurth at that place, after having visited the oasis of Reian and the hill of Heram. His observations had convinced him of the entire accuracy of the information furnished by ancient authors regarding these places.—The Minister for Foreign Affairs forwarded a copy of a despatch addressed to him by the French Consul at Asuncion with reference to the recent journey of M. Thouar.—M. Hangsen-Blangsted sent a short communication regarding the wooden maps brought home from Greenland by Lieut. Holm and supposed by him to be the work of the natives. M. H. Blangsted doubted whether the Esquimaux possessed the skill required to produce such maps. He was of opinion that the maps had been executed by some member of the unfortunate *Lilloise* expedition.—M. W. Huber, General Secretary to the Commission of Prizes, announced that the following awards had been made for the year 1886:—The large Gold Medal had been awarded to MM. B. Capello and R. Ivens, for their three journeys in Africa and their last expedition across the continent; the Gold Medal to the Pundit A-K for his journey in Upper Tibet; Logerot Prize to M. Marche for his explorations in the Philippines; Silver Medal to M. Bloyet for his topographical work in the regions of Eastern Africa; Bronze Medal to M. H. Mager for his Colonial Atlas published by M. Charles Bayle.—M. Dunoyer de Segonzac read a short paper on the question of the organisation of Tongking, and suggested the formation in Paris of corps of French officers who should study the Annamite and Chinese languages with the view to future administration in those countries.—The Chairman intimated the presence on the platform of Captain Monteil, chief of the last topographical mission on the Upper Senegal and the Niger, whose works, he said, had added so much to our geographical knowledge of French Soudan.—In conclusion, Vicomte de Brettes gave the results of his explorations (1885) in Southern Gran Chaco.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Bielz, E. Albert.—Siebenbürgen. Ein Handbuch für Reisende nach eigenen zahlreichen Reisen und Ausflügen in diesem Lände. 2te Auflage. Wien, Carl Graeser, 1885: pp. viii. and 415.

Herr Bielz began so long ago as 1841 to make acquaintance with Transylvania as a tourist ground, and having continued his journeys at frequent intervals ever since, has therefore had ample opportunity of becoming familiar with a country abounding in interest. The information seems well arranged and ample, though more precise details about accommodation in the leading places to be visited, would have been useful. Besides several small maps and plans in the text, there is one large map to the scale of 1 : 750,000.

Lauser, [Dr.] Wilhelm.—Ein Herbstausflug nach Siebenbürgen. Wien, Carl Graeser, 1886: 8vo., pp. iv. and 68, 28 illustrations.

This is a contribution to the "Wien" Section of the Transylvanian Karpathien-Verein, by which it is edited. It is a very pleasant account of Dr. Lauser's tour in Transylvania, and will be useful to others who are inclined to follow his example. The numerous illustrations are well executed.

Colleville, [Rev.] Merille de.—Belgique et Congo, ou Richesse, Bienfaisance et Gloire. Vers et Notes. Brighton, 1886: 8vo., pp. 24. [Presented by the author.]

Lietopici glavnoi phisicheskoi observatorii.—Annals of the Central Physical Observatory, edited by H. Wild, Part II. St. Petersburg, 1885: pp. xliv. and 571, with a map.

This volume contains the meteorological observations conducted on the international scheme of the 2nd and 3rd order in Russia for the year 1884. In his preface Professor Wild, Director of the St. Petersburg Observatory, states that the forms laid down by the International Commission have been strictly adhered to, both in the mode of taking and computing the observations as well as in their publication. Altogether 227 stations sent reports; of these 42 were excluded as not strictly complying with requirements, either because of their being incomplete or unreliable, 185 are therefore included in this volume, and of 105 of these, for lack of funds, only the monthly and annual averages are printed. The new style has been invariably followed for time. The temperature of the air is expressed in degrees of Celsius, absolute humidity in millimetres, relative humidity in decimals of saturation, the height of the barometer in degrees, and the quantity of deposits in millimetres. Nebulosity is recorded in values of figures, thus 10 indicates a sky completely overcast, the addition of figures between brackets (0) (2) denotes that either the clouds were very fine (0) or very thick (2). In the column reserved for remarks, special phenomena are indicated by signs in accordance with international regulations. The observations were recorded three times a day, at 7, 1, and 9 o'clock. After these general remarks there follow special observations on individual stations by senior observer R. Bergmann. From these it is interesting to find that observers are working in communication with the central observatory at such remote places as Obdorsk, Yeniseisk, Turukhansk, Olekminsk, Irkutsk, Blagovestchensk, and Nikolaiefsk on the Amur; Kizil Arvat in what was recently Turkoman country, Peking, Tabriz, and Teheran, all contributing their quota to the materials collected in this volume. The map is interesting. It shows every station in violet ink numbered, the numbers agreeing with a separate list at the end of the volume where the latitude and longitude of each station are given. The letterpress is both in German and Russian.—[**E. D. M.**]

ASIA.

[India.]—Memoirs of the Geological Survey of India. Palæontologia Indica, being Figures and Descriptions of the Organic Remains procured during the Progress of the Geological Survey of India. Ser. X. Indian Tertiary and Post-Tertiary Vertebrata. Vol. III. Parts 7 and 8. Siwalik Crocodilia, Lacertilia and Ophidia; and Tertiary Fishes. By R. Lydekker, B.A., F.G.S., &c. Calcutta, Geological Survey Office; London, Trübner & Co., 1886: 10 plates, folio.

Lowell, Percival.—Chosön, the Land of the Morning Calm. A Sketch of Korea. Illustrated from photographs by the Author. London, Trübner, 1885: 8vo., pp. x. and 412. Price 24*s*.

Mr. Lowell accompanied the Corean embassy to the United States in the autumn of 1883 in an official capacity, and returned with them to Söul, where he spent the winter. His position gave him exceptional opportunities of becoming well acquainted with the inner life, the social and political organisation of a country our knowledge of which is only beginning to assume definite shape. After a sketch of the geography, the climate, and the coast of the country, Mr. Lowell describes his journey to Söul, and gives the results of his observations during his stay in the country. The capital itself, and its surroundings, he describes in minute detail. Specially precise and novel is the information he gives on the administration and official life of the country. Social grades are regulated with a niceness of shade not to be met with even in Germany. The approach to the audience-chamber or reception-room is studded with a series of granite pillars to regulate the distances at which the various classes of officials must stand from the royal presence. Mr. Lowell devotes four chapters to what he calls the Triad of Principles—which he makes out to be Impersonality, the Patriarchal System, and the Position of Women. While there is much that is fanciful in these chapters, there is also much that is interesting and instructive. The chapter on presentation at court is also of interest, and Mr. Lowell's description of his various friends and acquaintances among the Coreans. Questions of religion, mythology, language, architecture, gardening, costume, and other points are treated of in very entertaining fashion. On the whole, without any attempt at system, Mr. Lowell succeeds in adding considerably to our previous knowledge of an interesting country. There is a map of Corea mainly from Japanese sources, and also a curious Corean map of the world, which, as Mr. Lowell puts it, reminds us strikingly of our maps of "The world as known to the Ancients." It is from an atlas compiled by a Corean some fifty years ago, and is no doubt due to the influence of the Jesuits upon Chinese notions of geography. The numerous photographic illustrations are an excellent feature.

Moser, Henri.—A Travers l'Asie Centrale. Paris, Plon, Nourst et Cie. [1885]: Large 8vo., pp. xi. and 463. Price 20*s*. (*Dulau.*)

M. Moser's journey, made in 1883–4, coincided to a considerable extent with that of Dr. Lansdell, the narrative of which was recently published. M. Moser did not *cross* Central Asia, strictly speaking. Starting from Orenburg, he came down by Lake Aral to Kasalinsk, and by the right bank of the Syr-Daria to Tashkent. Thence M. Moser went on to Bokhara, where he stayed some time, and of which, like Dr. Lansdell, he has much to tell. Skirting the Amu-Daria, M. Moser journeyed north-west to Khiva, and again south-west to Kizil Arvat. Making a detour to Geok Tepé and Askabad, he traversed North Persia to Teheran, and thence to Erzeli and Baku, and Europe. It will thus be seen that M. Moser has gone over ground made more or less familiar during recent years, and with much of which Dr. Lansdell deals in detail in his recent work. M. Moser certainly was in favour with General Chernaieff, and so had excellent facilities for seeing all that he wished. The most valuable part of his narrative, probably, is that which deals with the Khirgiz, Turkomans, and other native races. There are upwards of 170 illustrations, wood engravings and heliotypes, and a map on the scale of 1:4,200,000.

Schumacher, Gottlieb.—Across the Jordan: being an Exploration and Survey of part of Haurân and Jaulân. With additions by Laurence Oliphant and Guy le Strange. London, R. Bentley & Son, 1886: cr. 8vo., maps, plans, and illustrations, pp. xvi. and 342. Price 6*s.*

The greater portion of this volume embodies the results of the survey of the country east of the Jordan, made by Herr Schumacher in connection with the survey of the district between Damascus and Haifa, undertaken with a view to the construction of a railway. The memoir occupies three chapters as follows: I. General Physical characteristics; II. Eastern Jaulân; III. Western Haurân; and is accompanied by a map (scale $\frac{3}{8}$ of an inch to a mile), covering an area of 240 square miles, partly in the Haurân, partly in the Jaulân. Pp. 243 to 267 are occupied by an account of a Trip to the North-east of Lake Tiberias, in Jaulân, by Laurence Oliphant, accompanied by a map (scale 3·05 miles to an inch). This is followed by an account of a Ride through 'Ajlûn and the Belkâ during the autumn of 1884, by Guy le Strange, illustrated by a map (scale 5·5 miles to an inch), showing the author's route. An index concludes the volume. It may here be noted that the entire volume is edited by Mr. Guy le Strange, who has also provided the index.

Swettenham, F. A.—Journal kept during a journey across the Malay Peninsula (with maps). In 'Journal' of the Straits Branch of the Royal Asiatic Society, June 1885. London, Trübner: pp. 1–37.

This journey was made in April and May 1885, through Pahang, from the mouth of the Bernam near to that of the Pahang river. The journal contains many notes on the hydrography and topography of the country. There is a sketch-map on the scale of 15 miles to an inch.

AFRICA.

Buchanan, John.—The Shiré Highlands (East Central Africa), as Colony and Mission. Edinburgh and London, Blackwood, 1885: 8vo., pp. vi. and 260.

Mr. Buchanan is a planter at Zemba, on Lake Shirwa, and has had opportunities of seeing much of the country and people around the lake, and more especially of the results of the work of the missionaries established there. There are chapters on the Shiré Highlands; gardening and agricultural work at Blantyre and Zemba; chiefs and tribes of the district, and their working powers; native agriculture, industries, customs, and beliefs; and on the work of the various mission stations. There is a map of the Lake Nyassa region on the scale of 100 miles to an inch.

Ibrahim-Hilmy, [H.H.] Prince.—The Literature of Egypt and the Soudan from the earliest times to the year 1885 inclusive. A Bibliography, comprising printed books, periodical writings, and papers of learned societies, maps and charts, ancient papyri, manuscripts, drawings, &c. London, Trübner & Co., 1886: 2 vols. 4to., vol. i., A–L, pp. vii. and 398. Price 31*s.* 6*d.*

Prince Ibrahim-Hilmy has undertaken a formidable but extremely useful task. The result, so far as can be judged from this first volume, is highly satisfactory; though no doubt in his appendices and future editions, he will find not a few additions to make. The arrangement is purely alphabetical, and many of the entries are of course geographical. Perhaps it might be possible to add a classified index, bringing together in brief titles works belonging to the leading sections.

Sibree, [Rev.] J.—A Madagascar Bibliography, including publications in the Malagasy language, and a list of maps of Madagascar. Antananarivo, London Missionary Society, 1885: 8vo., pp. iv. and 92. (*Trübner.*)

This Bibliography is arranged in two parts:—1. Alphabetically under author's names; 2. Chronologically according to subject. We need scarcely point out what a valuable service Mr. Sibree has rendered in compiling such a work.

He admits that it is defective in certain directions, especially in works and papers relating to the zoology and botany of the island. In making so excellent a beginning, he has done the heaviest part of the work; it will be easy for others to supply the lacunæ.

Zöller, Hugo.—Forschungsreisen in der deutschen Colonie Kamerun. Three vols. 8vo. Vol. i. pp. xii. and 291, vol. ii. pp. viii. and 250, vol. iii. pp. viii. and 234. Berlin and Stuttgart, Spemann, 1885. Price 5s. each volume. (*Trübner.*)

These are the continuation of Herr Zöller's series of volumes on his visits to the German possessions in West Africa as correspondent of the *Kölnische Zeitung*. The first volume related to Togoland and the Slave Coast ('Proc.,' vol. vii. p. 487). The first one hundred pages of the first of the above volumes touch on the English Gold Coast Colonies, Dahomey, Lagos, Porto Novo, the Niger Mouths, and Fernando Po. From Bimbia Herr Zöller ascended the Cameroons to their highest summit by Mann's Spring and Hunter's Hut. The same signs of former volcanic activity met with by previous visitors were seen by him, though vegetation and animal life (antelopes) were met with almost to the summit. Herr Zöller's narratives and his maps add somewhat to our previous knowledge; though we may expect many more details and more precise scientific information from Mr. Rogozinski's narrative. Herr Zöller had considerable opportunities of visiting the district under German protection, and gives a graphic account of what he saw and did. His information on the river-delta and its immediate neighbourhood are of real geographical value, and the maps which he gives will be of service. He has a special chapter on the Cameroons under German protection. On his return journey he visited the Congo and went up as far as Vivi. In the appendices will be found various meteorological data on West Africa; distances between various coast places; list of West African firms; the literature of Togo and the Cameroons; geological results of Herr Zöller's journeys. There are numerous sketches throughout the volumes. The maps are:—Small sketch-map of the Cameroon mountains; Togo and Povo Lands, after a survey by Herr Zöller (5 miles to an inch); southern slopes of the Cameroon Mountains (2 nautical miles to an inch); small sketch of the Makin district of West Africa; plan of the attack on King Bell's town; the Cameroons river region (2 nautical miles to an inch); middle course of the river Wuri (3 nautical miles to an inch); the southern Cameroons region (5 nautical miles to an inch); the Botanga or Morunga river (1½ nautical mile to an inch); Togo and Povo Lands in the year 1699; the Cameroons in 1699.

AMERICA.

[America, United States.]—Department of the Interior. United States Geological Survey, J. W. Powell, Director. Bulletin of the United States Geological Survey. Nos. 7–14. Washington, Government Printing Office, 1884–1885: 8vo., map and plates. [Presented by the Director U.S. Geological Survey.]

No. 7. Mapoteca Geologica Americana. A Catalogue of Geological Maps of America (North and South), 1752–1881, in geographic and chronologic order, by Jules Marcou and John Belknap Marcou. No. 8. On Secondary Enlargements of Mineral Fragments in certain rocks, by R. D. Irving and C. R. Van Hise. No. 9. A Report of Work done in the Washington Laboratory during the fiscal year 1883–84. No. 10. On the Cambrian Faunas of North America; preliminary studies by Charles Doolittle Walcott. No. 11. On the Quaternary and Recent Mollusca of the Great Basin, with descriptions of new forms, by R. Ellsworth Call. Introduced by a Sketch of the Quaternary Lakes of the Great Basin, by G. K. Gilbert. No. 12. A Crystallographic Study of the Thinolite of Lake Lahontan, by Edward S. Dana. No. 13. Boundaries of the United States and of the several States and Territories, with an Historical Sketch of the Territorial changes, by Henry Gannett. No. 14. The Electrical and Magnetic Properties of the Iron-Carburets, by Carl Barus and Vincent Strouhal.

ARCTIC.

Greely, Adolphus W.—Three Years of Arctic Service: an Account of the Lady Franklin Bay Expedition of 1881–84, and the Attainment of the Farthest North. With nearly 100 illustrations made from photographs taken by the party, and with the official maps and charts. London, Bentley & Son, 1886: 2 vols. large 8vo., vol. i., pp. xxv. and 428; vol. ii., pp. xii. and 444. Price 42*s*.

Major Greely has himself told in the pages of the 'Proceedings' the leading events of one of the most remarkable and one of the saddest Arctic expeditions of recent times; and his eloquent lecture may be taken as a summary of these two magnificent volumes. The most striking feature of this work on first opening it is without doubt the illustrations. The beauty and evident accuracy of these has never been surpassed, if indeed equalled, in any similar work. They form an instructive illustration of the services which photography is capable of rendering to geography. A study of these illustrations will tell more than pages of description of the appearance and character and texture of the rocks and ice of the far north, of hummocks and ice-foot, glaciers and icebergs, and the many other peculiar features of the Arctic. The expedition, it will be remembered, was primarily intended as one of the International Polar observing parties, established all round the Arctic area, for the purpose of collecting data on its meteorology, physics, and biology. It, however, began work one year before the other parties, having established itself at Fort Conger, in Discovery Harbour, Lady Franklin Bay, 81° 44′ N. lat., on August 11th, 1881. From this time, until within a few days of the rescue of the surviving members of the party, in June 1884, the programme laid down for these observing stations was faithfully and regularly carried out, and the results will find their place in the valuable body of data obtained by the various expeditions, which are no doubt being worked out.

Major Greely speaks very frankly of the inner life of his expedition, and Arctic commanders will sympathise with his troubles and difficulties, to a large extent due to the peculiar organisation of the United States Army, though partly also to one or two ill-conditioned members of the staff. Under the circumstances Major Greely's conduct of the expedition, to judge from the information contained in these two volumes, was highly creditable. The work he planned and which was carried out by himself and others was very considerable in extent, and the results of great geographical value. The means at his command were extremely limited, but he made the best of them. One fatal error made by those who organised the expedition, was to leave these twenty-five men within eight degrees of the Pole, without any adequate means of escape, in case of accident.

During the first year a very considerable amount of exploring work was accomplished, and to that most of the first volume is devoted. Depôts were planted at various points round the east coast of Grinnell Land, and preparations made for the work to be carried out in the spring and summer of 1882. The most important part of this work was the exploration of the North Greenland coast by Mr. Lockwood and party. They carried the coast of Greenland some 10° further to the north-east than Beaumont, and in doing so succeeded in attaining a latitude about four miles further north than that reached by Captain Markham in the Nares Expedition. But it should be remembered that in Lockwood's case the journey was made along the edge of a coast, while Captain Markham's party struck boldly out into the waste of "palæocrystic" ice. But Lockwood's trying journey was in every way praiseworthy and successful. The coast visited by Lockwood is like that further south, broken up by fjörds, and the interior, so far as could be seen, is a waste of undulating snow. It is greatly to be desired that the few degrees remaining to complete the coast-line of North Greenland, and join the explorations of east and west, should be completed; and also some further attempt made to verify Sir Joseph Hooker's conjecture that a portion of the interior will show a comparatively luxuriant summer vegetation.

In the spring of 1882, Dr. Pavy, the surgeon of the expedition ("Qu'allait-il faire dans cette galère"? those who know his career will be inclined to ask),

made an attempt to reach land to the northward of Cape Joseph Henry, but was quite unsuccessful, the highest latitude reached by Dr. Pavy being 82° 56′ (estimated).

Perhaps the most important and interesting work accomplished in the spring and summer of 1882 was that by Major Greely himself in the interior of Grinnell Land. Here he verified in a very remarkable way the conjecture of Sir Joseph Hooker in 1877, from the facts then known concerning Grinnell Land, that, like Greenland, it is not an ice-capped, but an ice-girt island. So, in fact, did Major Greely and Mr. Lockwood find it to be the case. Between a little north of 81° and 82°, and between 65° 30′ and 80° west, we have an Arctic oasis, in which even in April Major Greely found little snow. On its northern edge is Lake Hazen, a large sheet of fresh water, around which are numerous smaller lakes discharging into it. In April, too, Major Greely found one river at least quite open. The valleys give birth to a comparatively luxuriant vegetation, which serves as pasturage for considerable game. Its northern borders are bounded by the Conger and United States Mountains, through which breaks a magnificent glacier, abutting on Lake Hazen, with a convex face some five miles long and over 150 feet high, an outlier of the great ice-cap which covers all the north of Grinnell Land. Returning again in June for further exploration, he found the vegetation luxuriant and animal life abundant. Besides grass in plenty, willows, beds of dryas, and saxifrages were common; butterflies were numerous, and bumble-bees and "devil's darning-needles" flitted about. Ample remains of recent Eskimo settlements were found, and fossil testimonies to the former temperate character of the climate, and the recent elevation of the whole land. Temperatures almost oppressive were experienced on this journey, rising to 74° on one occasion in the shade. On another occasion, in the end of June, the temperature in the shade was 64°, while at Fort Conger it was only 51·2°, thus confirming the observations of the Nares Expedition. In the spring of 1883 Lockwood and Brainard penetrated westward along the south edge of the oasis, and came out on Greely Fjörd, which cuts far into the west of Grinnell Land, the west coast of which evidently trends north-west and north to Aldrich's Furthest. Here also the steep face of an immense glacier was met with, which stretched south in an undulating plateau as far as the eye could reach.

The fjörds which stretch westwards from Lady Franklin Bay were carefully explored and accurately laid down, and much other subsidiary work done during the long stay of the expedition at Fort Conger. During all this time the health of the expedition was wonderful, with no traces of scurvy. Major Greely gave careful attention to dietary, and his experience will be of service to future expeditions. In one chapter, he discusses several questions connected with the varied ice-forms of the Polar regions; we need only allude to his theory of "palæocrystic" ice, which he expounded at length in his address to the Society. Most of the second volume is occupied with the attempts of the expedition to escape in the autumn of 1883. Major Greely was bound by his instructions to abandon Fort Conger in September of that year. He speaks in justifiably severe terms of the grievous mismanagement of the two first relief expeditions, and of the fatal selfishness of the second expedition in failing to carry out its instructions as to the cacheing of provisions. The story of the weary winter at Cape Sabine, of the heroic endurance of the poor men, their noble acts of unselfishness, and the final rescue in June 1884 of the half-dozen survivors, is known to all.

So far as geographical results are concerned, the work of this expedition must take a high rank. The revelations as to the physical conditions of Grinnell Land are themselves of great scientific value. Besides the meteorological observations, the appendices (pp. 340–424) contain much valuable scientific matter. There are sections on the maximum thickness of salt-water ice observed at various Polar stations; Results of Sound experiment at Fort Conger; Ethnology; Natural History Notes; Ornithology; Botany; Mosses and Lichens; Report on the Medusæ collected; On Salmon caught in Lake Alexandra; Account of Auroral displays accompanying the great magnetic storm of Nov. 15–19, 1882, noted at Fort Conger; Report of Sergeant Brainard on a petrified forest discovered near Cape Baird; Report by Sergeant Gardiner

on the Fossils collected at Cape Cracroft; List of Game obtained by the Lady Franklin Bay Expedition within the Arctic Circle.

The maps are the following:—The Arctic Regions, showing locations of Circumpolar Stations, 1881–3 (small); Fort Conger and Vicinity (1 nautical mile to three-eighths of an inch); Explorations of Lockwood on the Greenland Coast (10 statute miles to an inch); chart of discoveries in North Greenland, by Lockwood (15 geographical miles to an inch); Major Greely's discoveries in Grinnell Land (12 miles to an inch); Route of Sledge Expedition to the Greenland Coast, March 27 to April 12, 1883 (12 miles to an inch); Discoveries in Grinnell Land by Greely and Lockwood; Grinnell Land as at present known; Chart of the Arctic Ocean (100 nautical miles to an inch).

OCEANIA.

Codrington, R. H. [D.D.]—The Melanesian Languages. Oxford, Clarendon Press, 1885: 8vo., pp. viii. and 572. Price 18*s*.

It is well known that the late Bishop Patteson, who was murdered by the natives of the Solomon Islands in 1871, was a great linguist, and was engaged in the study of the scores of dialects in the wonderful islands of Melanesia. He, however, published little or nothing, but his mantle fell on Dr. Codrington, one of his companions, who carried on the studies of his lamented friend, and amplified them by the help of the lads collected from the islands in the Training College in Norfolk Island. During his late visit to Europe he has reduced his materials to order and published a handsome volume, revealing entirely fresh linguistic phenomena of two varieties, I. the Melanesian pure, and II. the Polynesian, being the form of speech of immigrants from the Eastern Islands. The language of the Island of Motu, the headquarters of the Mission, has become the lingua franca of the Mission, and all the adherents of the Mission, and will be the vehicle of the new civilisation; probably in the course of time it will tread out the kindred varieties spoken in the islands. In one small island there are no less than fifteen varieties of speech.—**[R. N. C.]**

Findlay, A. G.—A Directory for the Navigation of the North Pacific Ocean, with descriptions of its Coasts, Islands, etc., from Panama to Behring Strait, and Japan; its Winds, Currents, and Passages. Third edition. London, R. H. Laurie, 1886: large 8vo., charts and plates, pp. 1315. Price 28*s*. [Presented by the publisher.]

The present edition of this work has materially increased in size, to the previous one, published in 1870, being 308 pages in excess. It has been very carefully revised, matter incorporated having been obtained from useful sources, and brought up to date.

GENERAL.

Abercrombie, [Hon.] Ralph.—Principles of Forecasting by means of Weather Charts. Issued by the Authority of the Meteorological Council. London, J. D. Potter and E. Stanford, 1885: 8vo., map and charts, pp. viii. and 123. Price 1*s*. 9*d*.

British Museum.—Catalogue of the Printed Maps, Plans, and Charts of the British Museum. Printed by order of the Trustees. Sold at the British Museum; and by Longmans & Co., B. Quaritch, Asher & Co., and Trübner & Co., London, 1885. 2 vols. large 4to., double cols. Vol. i., pp. 4 and cols. 1–2020; vol. ii., cols. 2253–4648. Price 6*l*. 6*s*. [Presented by the Trustees of the British Museum.]

This catalogue represents the contents of the manuscript catalogue of British Museum maps in 323 volumes; the catalogue of maps and plans in the Royal Library, in two printed volumes; and the manuscript catalogue of charts in the same library. The manuscript catalogue of maps, which forms the chief basis of the present catalogue, was mainly made by and under the direction of Mr. R. H. Major, late keeper of the department of maps. By condensation in many ways, it has been found possible to include all the above materials in the present two

volumes, which probably contain something like 100,000 separate entries. The arrangement throughout is strictly alphabetical according to subject, as well as author. Under each heading come first atlases, followed by general maps, special maps, maps of particular regions, so that the catalogue is easy of consultation. The system of orthography is mainly that of Johnston's 'Dictionary of Geography,' except in the case of India, for which Hunter's 'Gazetteer of India' has been taken as the standard. The work is in every way creditable to Mr. Douglas, under whose care it has been compiled; its utility is obvious.

Faure, Charles.—Notice sur Arnold Guyot, 1807–1884. Genève, Imprimerie Charles Schuchardt, 1884: 8vo., pp. 72. [Presented by the author.]

Frere, Mary E. I.—The Right Hon. Sir Bartle Frere, G.C.B., G.C.S.I., F.R.S., &c. Obituary notice from 'Transactions' of the Royal Historical Society, New Series, vol. iii. Part I. London, Longman & Co, 1885: 8vo., pp. 153–187. [Presented by Miss Frere.]

Hertslet, [Sir] Edward.—A Complete Collection of the Treaties and Conventions, and Reciprocal Regulations at present subsisting between Great Britain and Foreign Powers; and of the Laws, Decrees, Orders in Council, &c., concerning the same; so far as they relate to Commerce and Navigation, the Slave Trade, Post-Office Communications, Copyright, &c.; and to the Privileges and Interests of the Subjects of the High Contracting Parties. Vol. xv. London, Butterworths, & Harrison, 1885: 8vo., pp. xl. and 1142.

——— General Index, arranged in order of Countries and Subjects, to Hertslet's Commercial Treaties, vols. i. to xv. With notes showing which Treaties and other Documents were in force on the 1st January, 1885. London, ditto, 1885: 8vo., pp. ix. and 583.

Levasseur, E.—La Statistique Graphique. London, E. Stanford, 1885: 8vo., maps and diagrams, pp. 34. [Presented by the author.]

Revue Coloniale Internationale.—Amsterdam, J. H. De Bussy; London, Trübner, 1885: tome i., pp. xvi. and 496; tome ii., parts i.–iii.

This journal seems to have taken an established place in the serial literature of geography and colonial matters; up to the present it has been edited with much judgment by Professor Kan and his colleagues. Among the papers of more directly geographical interest in the first volume are the following:—Martinique in 1789-90, by M. Hurard; the Mestizoes of the Philippine Islands, by Prof. Blumentritt; the Sawu or Haawu Group, with a sketch-map, by J. G. F. Riedel; French Indo-China, by Louis Vignon; the Cartography of the Dutch East Indies, by Major F. de Bas; Europeans in the Tropics, by Dr. Woeikoff. The monthly bibliography is of much value. In the February number of the present year is an article on Hadramaut, by Prof. De Goeje.

Ritter von Hauer, Dr. Franz.— Annalen des K. K. Naturhistorischen Hofmuseums. Redigirt von Dr. Franz Ritter von Hauer. Band i. Nr. 1. Jahresbericht für 1885, von Dr. von Hauer. Wien, Alfred Hölder, 1886: 8vo., pp. 46.

Contains a description of the new museum and its internal arrangements.

Wagner, Hermann.—Geographisches Jahrbuch. X. Band, 1884. Zweite Hälfte. Gotha, Justus Perthes, 1885: 8vo., pp. xx. and 321–692. (*Dulau.*)

The first part of the tenth volume of the 'Jahrbuch' has been already noticed ('Proceedings,' vol. vii. p. 264). The present instalment is unusually full of instructive matter; but it is impossible to do more here than indicate its contents. Dr. Siegmund Günther (pp. 323–354) discusses very thoroughly recent cartographical methods, with critical remarks on the older methods. Professor Egli of Zurich (pp. 355–384) contributes on recent researches in connection with geographical names. From the late Professor Zöppritz, of

Königsberg (pp. 385–400), there is a brief sketch of recent deep-sea researches, and from the same writer (pp. 445–471) we have a résumé of recent exploration in Africa. There is a paper of special interest (pp. 400–444) by Professor Hirschfeld, of Königsberg, on the present standpoint of our knowledge of the geography of the ancient "Kulturländer," especially the Balkan Peninsula, Greece, and Asia Minor. Recent exploration in Asia is noted by Dr. H. Lullies of Königsberg (pp. 471–502); Australia and Polynesia by Dr. H. Hausberg of Lübeck (pp. 503–523); the Polar Regions by H. Wichmann of Gotha (pp. 523–538). Dr. H. Wagner occupies, to excellent purpose, an unusually large space (pp. 539–650) with his review of recent advances in the methods and study of geography. One section he devotes to general geographical methodology, in which he discusses such points as the idea or ideal aim of geography; the conception of geography; the system of geography; the categories or various standpoints of geographical study; geographical classifications. Dr. Wagner then proceeds to discuss the methodical development of the various branches of geography and their relations with the sciences on which they bear—cosmography, geophysics, geology, biological geography, anthropography, special grography. In the section devoted to geographical education, he discusses the position in various countries, and throughout makes special reference to the Society's Report on the subject. Appended is a list of the geographical chairs in various European universities and special schools. In Germany there are now thirteen university chairs, besides four in special institutions; in Austria nine, besides the chair in the Vienna Commercial Academy; one in Denmark; five chairs of geography, besides seven of history and geography, and five series of geographical lectures in France; twelve chairs in Italy; one in the Netherlands; one in Russia; and two in Switzerland. Herr Wichmann contributes the statistics (pp. 650–668) of geographical Societies and geographical periodicals. From this we take the following table:—

		No. of Societies.	Members.	Income. Marks.	Subventions. Marks.
A. Great States.	France and Algeria	26	18,000	220,000	17,000
	Germany	24	9,300	265,600	162,800
	Great Britain and Colonies	5	5,300	300,000	92,500
	Italy	6	2,680	53,750	17,840
	Austria-Hungary	2	1,900	19,900	3,600
	Russia	4	1,380	206,000	95,000
	United States	2	1,500	66,000	..
B. Smaller States.	Belgium	2	1,300	13,000	1,440
	Netherlands	2	1,270	32,000	1,050
	Portugal and Colonies	2	1,200	24,660	2,670
	Switzerland	6	1,000	7,880	1,896
	Denmark	1	750	5,000	..
	Sweden	1	750	7,916	..
	Spain	2	630	66,070	25,600
	Argentine Republic	2	600	45,000	24,000
	Brazil	3	430	35,432	22,450
	Japan	1	200	9,700	..
	Roumania	1	179	6,557	800
	Egypt	1	175	10,000	8,000
	Mexico	1	150	10,520	..
	Total	94	48,600	1,405,000	476,600

Including the publications of these Societies, there are 126 periodicals more or less devoted to geography. Professor Wagner follows with a short paper (pp. 668–674) on geographical congresses and exhibitions, and Herr Auwers with a list of latitudes and longitudes of 175 observatories.

The Statesman's Year-Book. Statistical and Historical Annual of the States of the Civilised World, for the year 1866. Edited by J. Scott Keltie. London, Macmillan & Co., 1886: cr. 8vo., pp. xxiii. and 936. Price 10*s.* 6*d.* [Presented by the publishers.]

The following works have also been added to the Library :—

Borchgrave, Emile de.—La Serbie; administrative, économique et commerciale. Bruxelles, P. Weissenbruch; Belgrade, P. Tchourtchitch, 1883: 8vo., pp. 240.

Hertslet [Sir] Edward.—General Index (chronologically and alphabetically arranged) to the British and Foreign State Papers; vol i. to vol. lxiii. (1373 to 1873), vol. lxiv. London, W. Ridgway, 1879: 8vo., pp. 1607.

Thorough Guide Series.—Edited by M. J. B. Baddeley, B.A., and C. S. Ward, M.A. The Eastern Counties; their Watering Places, Cathedral Cities, and other Places of Interest, together with the Approaches from London. By C. S. Ward. London, Dulau & Co., 1883: 12mo., maps and plans, pp. xvi. and 132. Price 2*s.* 6*d.*

——— Ditto. The English Lake District. By M. J. B. Baddeley. With maps, general and sectional. Third edition, revised. London, ditto, 1884: 12mo., pp. xxxii. and 216. Price 5*s.*

——— Ditto. The Peak District of Derbyshire and Neighbouring Counties. By M. J. B. Baddeley. Third edition, revised. London, ditto, 1884: 12mo., maps and plan, pp. xxiv. and 142. Price 2*s.* 6*d.*

——— Ditto. North Devon and North Cornwall from Exmoor to the Land's End. By C. S. Ward. Third edition, revised. London, ditto, 1885: 12mo., maps and plans, pp. xvi. and 154. Price 3*s.*

——— Ditto. South Devon and South Cornwall, including Dartmoor and the Scilly Isles. By C. S. Ward and M. J. B. Baddeley. Second edition, revised. London, ditto, 1885: 12mo., maps and plans, pp. xvi. and 228. Price 4*s.*

[The above five guide-books were presented by Messrs. Dulau & Co.]

[United States.]—Narrative of the United States Exploring Expedition. During the years 1838, 1839, 1840, 1841, 1842. By Charles Wilkes, U.S.N., Commander of the Expedition. In five volumes, and an Atlas. Philadelphia, Lea and Blanchard, 1845: imp. 8vo., maps and plates, pp. (Vol. I.) lx. and 434; (II.) xv. and 476; (III.) xv. and 438; (IV.) xvi. and 539; (V.) xv. and 558.

[———] United States Exploring Expedition. During the years, etc. Under the command of Charles Wilkes, U.S.N. Ethnography and Philology. By Horatio Hale, Philologist of the Expedition. Philadelphia, ditto, 1846: imp. 4to., chart, pp. xii. and 666.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Bayern.—Topographischer Atlas der Königreich ——, bearbeitet im topographischer Bureau der K. b. Generalstabes. Scale 1 : 50,000 or 1·4 inches to a geographical mile. Blatt 20. West. Bamberg, und Blatt 39. West. Ansbach. München. Price 1*s.* 6*d.* each sheet. (*Dulau.*)

Böhmer-Walde.—Die Verbreitung der Glacialspuren im ——, von Fr. Bayberger. Scale 1 : 600,000 or 8·1 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 81, Taf. 1. Justus Perthes, Gotha, 1886. (*Dulau.*)

——— Profile der Seen im ———, von Fr. Bayberger. Scale 1 : 6000 or 12·2 inches to a geographical mile. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 81, Taf. 2. Justus Perthes, Gotha, 1886. (*Dulau.*)

Deutschland.—Oro-hydrographische und Eisenbahn-Wand-Karte von ——, von Dr. H. Möhl. Neu-bearbeitet und herausgegeben von W. Keil. 1 : 1,000,000 or 13·6 geographical miles to an inch. 12 sheets. Cassel, Fischer. Price 14*s.* (*Dulau.*)

Deutschen Reiches.—Karte des ——. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1885. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Sheets:—151, Malchin; 185, Woldegk; 449, Schweidnitz; 474, Frankenstein; 476, Grottkau; 497, Neisse; 499, Cosel; 500, Gleiwitz; 538, Pless; 571, Pirmasens. Price 1*s.* 6*d.* each sheet. (*Dulau.*)

Oesterreichsch-Ungarischen Monarchie.—Specialkarte der ——. Scale 1 : 75,000 or 1 geographical mile to an inch. K. k. militär geografisches Institut, Wien, 1885. Sheets:—Zone 8, Col. XIX. Viszoka und Kisnca-Ujhely. 9, XVIII. Wisowitz und Bellus. 10, XVIII. Trentschin. 11, XVII. Szenic und Pistyán. 15, XXI. Hatvan und Gödöllö. 15, XXII. Kaál und Jászbetrény. 18, XXII. Tisza-Inoka. 18, XXV. Kecskemét. 16, XXIII. Tisza-Roff. 15, XXIV. Gsege. 25, XIX. Gradište und Bos. Samac. 26, XIX. Jamina und Bjelina. 33, XVI. Ravča und Zastražišće. 34, XV. Velaluka. Price 1*s.* 4*d.* each sheet. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued during the month of February 1886.

1-inch—General Maps:—England and Wales, sheet 240 (new series), 1*s.*
Scotland: 89 (Outline), 108 (Hills), 1*s.* 9*d.* each.

6-inch—County Maps:—

England and Wales: **Brecknockshire:** 25 N.E., S.E., 37 S.E.; 1*s.* each. **Cambridgeshire:** 47 S.E., 48 N.W., N.E., S.E., 55 N.W., N.E., S.W., S.E., 60 N.W., N.E.; 1*s.* each. **Carmarthenshire:** 27 N.E., S.E., 42 N.E.; 1*s.* each. **Derbyshire:** 50 N.W.; 1*s.* **Devonshire:** 52 N.E., S.E., 107 S.W., 131 N.W., S.W., S.E., 133 S.W.; 1*s.* each. **Glamorganshire:** 13, 29; 2*s.* 6*d.* each. **Herefordshire:** 8 S.W., S.E., 13 N.W., N.E.; 1*s.* each. **Huntingdonshire:** 20 N.W. (20 S.W. and S.E. (on one sheet), 24 N.E.; 1*s.* each. **Leicestershire:** 31 N.W., N.E., 37 S.E.; 1*s.* each. **Lincolnshire:** (9 N.W. and N.E. on one sheet), 26 N.W., N.E., S.W., S.E., 35 N.W., S.E., 52 N.W., N.E., 61 N.W., N.E., 150 N.E.; 1*s.* each. **Monmouthshire:** 17, 27; 2*s.* 6*d.* each. **Montgomeryshire:** 9 N.W., 27 S.E., 34 N.E., S.W., 35 N.W., 41 S.W.; 1*s.* each. **Northamptonshire:** 1 N.E., 48 N.E., S.E.; 1*s.* each. **Norfolk:** 13 N.E., 14 N.W., N.E., S.E., 15 N.W., N.E., S.W., S.E., 18 N.W., N.E., S.W., S.E., 20 N.W., N.E., 63 S.E., 75 N.W., 94 S.W.; 1*s.* each. **Nottinghamshire:** 9 S.E. (without contours), 38 S.W., S.E., 42 N.W., N.E. (with contours); 1*s.* each. **Rutland:** 10 N.E.; 1*s.* each. **Somersetshire:** 38 N.E., 51 N.W., S.W., 62 N.W., N.E., S.W., S.E., 64 N.W.; 1*s.* each. **Staffordshire:** 63 S.W., 67 S.W., 68 N.E.; 1*s.* each. **Suffolk:** 75 S.W.; 1*s.* **Warwickshire:** 44 N.E., 45 N.E., 46 N.E., S.W., S.E., 52 N.W., N.E., S.W., 54 N.W., N.E.; 1*s.* each. **Worcestershire:** 33 N.E., 39 S.E., 40 N.W., 52 N.W.; 1*s.* each.

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(*Stanford, Agent.*)

AFRICA.

Afrika.—Neueste Karte von ——. Scale 1 : 7,500,000 or 102·7 geographical miles to an inch. 4 Blätt. Stuttgart, Maier. (*Dulau.*)

Hárār nach Bérbera.—Reiseroute des Major's Heath und des Lieutenants Peyton von ——, June 1885. Nach den Aufnahmen des Brigade-Majors Heath, konstruirt von Prof. Dr. Philipp Paulitschke. Scale 1 : 750,000 or 10·3 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 5. Justus Perthes, Gotha. (*Dulau.*)

Kaffraria und die Östlichen Grenz-Distrikte der Cap-Kolonie.—Von H. C. Schunke. Scale 1 : 750,000 or 10·3 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1885, Tafel 9. Justus Perthes, Gotha. (*Dulau.*)

Transvaal.—Das untere Olifant-Becken (Südafrikanische Republik). Mit besonderer Berücksichtigung der Eingeborenen-Bevölkerung gezeichnet von Dr. H. Raddatz. Scale 1 : 600,000 or 8·2 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 4. Justus Perthes, Gotha. (*Dulau.*)

AMERICA.

Colombian Isthmus.—Carte Générale de l'Isthme columbien, dressée par Lucien N. B. Wyse, Chef des Commissions internationales d'exploration de 1876-77-78,

d'après les travaux exécutés sous sa direction et les documents les plus récents. Scale 1 : 500,000 or 6·8 geographical miles to an inch. 1886. Gravé et imprimé par Erhard, Paris.

The labours of M. Lucien N. B. Wyse in connection with the surveys of the Colombian Isthmus, extend over more than ten years, and it is not, therefore, surprising that he should have been able to produce this excellent map (published in his recent work 'Le Canal de Panama') a copy of which, impressed on Japanese paper, has been presented by the author to the Map Room collection of this Society. M. Wyse has been most active in giving to the public the results of the surveys made by him, from time to time, in this region; and when we compare the present map with those previously published by him, we see that several important corrections and additions have been made. The three different schemes for crossing the Isthmus by canals, from Panama to Colon, the Bayano river to the Gulf of San Blas, and the Gulf of San Miguel to the river Atrato and Acanti, are laid down, and sections of each projected line are given. Soundings along the coasts in metres, and the eight and a half metre line are indicated. An inset map shows the general outline of the Central American States. This map is beautifully executed, and reflects great credit on both the author and engraver.

Panama Canal.—Plan Panoramique du Canal interocéanique à niveau et à ciel ouvert, supposé achevé, de la Baie de Limon à la rade de Panama, avec les dérivations praticables, le barrage-réservoir du Chagres, les déviations du chemin de fer, et les nouveaux ports des deux extrémités. D'après les plans adoptés en 1879 par le Congrès du Canal interocéanique (Projet Wyse et Reclus) et les Etudes définitives exécutées en 1881–82. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Gravé par Erhard, Paris.

This is a very beautifully executed plan of the country to be traversed by the Panama Canal. The course of the canal, with the necessary dams to control and divert the discharge of the rivers, are indicated, and at either end the proposed harbours for shipping are shown. The vast extent of the "Réservoir régulateur" formed by the dam to be constructed across the Chagres river, will convey some idea of the magnitude of the engineering works that have yet to be carried out. The hill-shading very clearly shows the nature of the country, and the difficulties which have to be overcome before the canal can be completed. This plan, which has been presented to the Map Room of the Society by M. Lucien N. B. Wyse, is impressed on Japanese paper, much resembling parchment in texture, and has been previously published in his book 'Le Canal de Panama.'

AUSTRALIA.

Australien.—Wandkarte von ——. Scale 1 : 8,330,000 or 114·1 geographical miles to an inch. 12 sheets. Berlin, Chun. Price 9*s*. (*Dulau.*)

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in January and February 1886.

No.			Inches.	
1607	m	=	1·4	England, river Thames:—North Foreland to the Nore. Price 3*s*.
74	m	=	5·0	Spain, north coast:—Portugalete and Bilbao. Price 1*s*. 6*d*.
906	m	=	0·76	North America, lake Huron:—Cabot head to cape Smith and entrance to Georgian bay (Plans, Tobermory harbour, Club harbour, Rattlesnake harbour). Price 2*s*.
269	m	=	0·14	North America, east coast:—Sapelo sound to Little Bahama bank. Price 2*s*. 6*d*.

No.			Inches.	
399	m	=	0·22	West Indies:—Bahama and Abaco islands, with the North-West Providence channel. Price 2*s.* 6*d.*
2089	m	=	0·17	Africa, east coast:—Tugela river to Delagoa bay (Plan, St. Lucia bay). Price 2*s.* 6*d.*
919	m m m	= = =	3·6 3·0 5·0	Gulf of Aden:—Obokh. Berbereh. Leila roadstead. Price 1*s.* 6*d.*
913	m	=	0·3	Yellow sea:—Western coast of the Korea, Mackau group to Clifford islands. Price 2*s.* 6*d.*
651	m	=	0·5	Japan:—Bungo channel. Price 2*s.*
917	m	=	various.	Australia, west coast:—Harbours and anchorages on the west coast of Australia—Mermaid strait. Hampton harbour. Fortescue road. Port Dongara or Denison. Price 2*s.*
916	m	=	2·0	New Guinea, south coast:—Su-a-u harbour. Price 2*s.*

199 Brindisi to Ortona:—New plan, Barletta.
(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
1607	North Foreland to the Nore ..	New chart, North Foreland to the Nore	1607
74	Portugalete and Bilbao	New plan, Portugalete and Bilbao	74
329	Rattlesnake harbour	New plan, Rattlesnake harbour	906
269	Sapelo sound to Florida and Providence channels	New chart, Sapelo sound to Little Bahama bank	269
399	Man-of-war cay anchorage	New chart, Bahama and Abaco islands, with the North-West Providence channels	399
400	Pelican and Little harbours		
2089	Tugela river to Delagoa bay ..	New chart, Tugela river to Delagoa bay	2089
253*a*	Plan of Obokh on this chart ..	New plan, Obokh, Berbereh, Zeila roadstead	919
253*b*	Plan of Berbereh on this chart ..		
162	Goro island.		

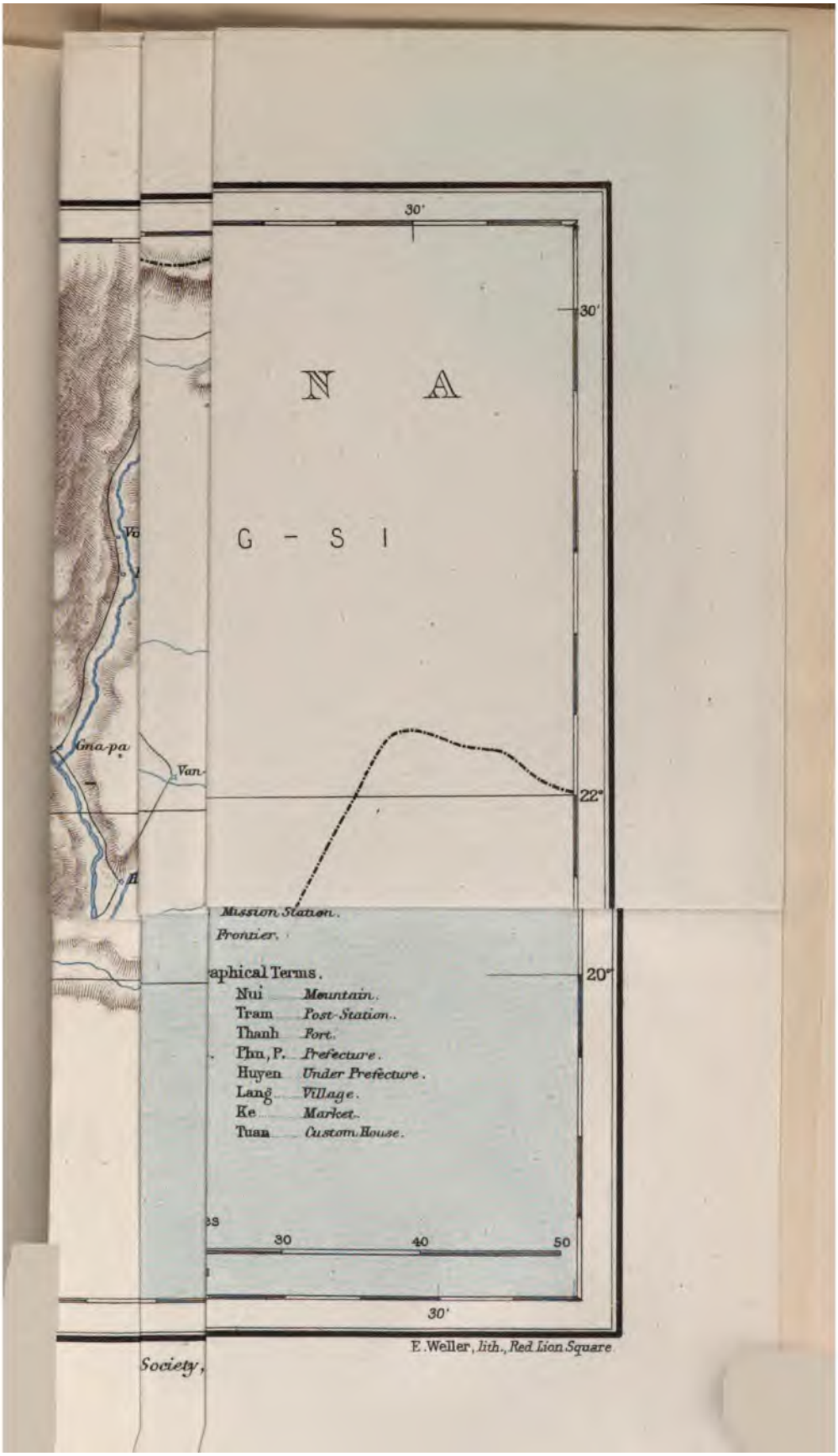
CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1610. England, east coast:—North Foreland to Orfordness. 1185. England, Thames river:—Sea reach. 1872. North sea:—Calais to the river Schelde entrance. 2260. Norway:—Ports on the south coast of Norway. 2327. Norway, south coast:—The Naze to Christiansund. 883. Norway:—Ports and anchorages on the south-west coast of Norway. 2307. Norway, west coast:—Smöelen island to Svee fiord. 2117. Baltic sea:—Kiel fiord. 2365. Baltic sea:—Rostock to Arkona light. 1343. France, north coast:—Adour river. 2556. France, north coast:—Calais. 438. France, north coast:—Boulogne. 2680. France, north coast:—Havre roadstead. 1758. Spain, west coast:—Arosa and Pontevedra bays. 165. Mediterranean sea:—Sardinia to Malta. 1689. Madeira:—Funchal bay. 2282. Arctic ocean and Greenland sea. 232*a*, *b*. North America, east coast:—Newfoundland island, 2 sheets. 893. Newfoundland, south coast:—Burin harbour to Devil bay. 2490. North America, east coast:—Pemaquid point to Fletchers neck. 2482. North America, east coast:—Fletchers neck to cape Cod. 2890. North America, east coast:—Nantucket shoals to Block island. 2755. North America, east coast:—Long island sound, western part. 1217. West Indies:—Florida strait. 2853. Gulf of Mexico:—Mississippi sound to Mobile

bay. 2820. Gulf of Mexico:—Pensacola bay entrance. 1751. South America, Rio de la Plata:—Saucé point to Martin Garcia island. 558. South America, south coast:—Ports in Desolation and Santa Ines islands. 641. Africa, south coast:—Port Elizabeth. 143. Red Sea:—Jebel Teïr to Perim island. 814. Bay of Bengal:—The Sandheads, False point to Mutlah river. 793*a*, *b*. Malacca strait:—Pulo Penang to Parcelor hill, 2 sheets. 795*a*. Malacca strait:—Cape Rachada to Mount Formosa. 934. Eastern archipelago:—Sourabaya, Baly, and Sapoedie straits. 2578. Eastern archipelago:—Sula or Mindoro sea, eastern part. 104. Korea:—Korean archipelago, southern portion. 2347. Japan:—Nipon, Kiusiu, and Sikok island. 2350. Australia, east coast:—Double point to cape Tribulation. 2764. Australia, east coast:—Coral sea, sheet 2. 2532. New Zealand:—Ninety miles beach to Otago. (*J. D. Potter, agent.*)

Dépôt des Cartes et Plans de la Marine.—Nos. 3957 and 3958, Atlantique Nord, Carte Types des Mouvements les plus Généraux de l'Atmosphère Inférieure et des Isobares Correspondantes, par L. Brault, Capt. de Frégate, 1885 (2 sheets).—4097, Mer de Chine, Tonkin. Passes de la Monche et du Casque, 1885 (Publication provisoire).—4069, Mer de Chine, Tonkin. Mouillage de la Vipère Tsieng-Mui-Tao, 1885 (Publication provisoire).—4034, Mer de Chine. Hainan. Mouillage de Hiong-Po, 1884.—4096, Mer de Chine, Tonkin. Passe du Roc aux Aigles, 1885 (Publication provisoire).—4100, Mer de Chine, Tonkin. Chenaux Intérieurs entre la Baie d'Halong et le Lach-Huyen, 1885 (Publication provisoire).—4026, Golfe du Tonkin, Grande Baie de Faï-tsi-Long. Chenaux Intérieurs entre Ke-Bao et l'Ile de l'Aigle, 1884.—4086, Tunisie, Côte Est, Mahedia (Ancienne Africa), 1885.—4094, Tunisie, Côte Nord, Benzert, Anciennement Hippo-Zarite ou Diarrhytus, 1885.—4099, Tunisie, Côte Est, Presqu'île de Monastir, 1885.—4098, Mer des Indes, Madagascar, Rade et Port de Ste. Marie de Madagascar, 1885.—4092, Terre Neuve, Côte Est, le Grand Coup de Hache (Round Harbour), 1885.—4090, Terre Neuve, Côte Est, Baie des Pins (Mings' Bight), 1885.—4078, Ports et Mouillages de l'Archipel du Cap Horn. Ile Hoste, Anse Coralie, Baie Indienne, 1885.—4070, Côte Est de Patagonie, Embouchure de la Rivière Santa Cruz, 1885.—4068, Océan Pacifique, Tahiti, Côte Sud-Est de la Presqu'île de Taiarapu, de la Rivière Vaitoto à la Pointe Arupa, 1885.—4072, Océan Pacifique, Archipel de la Société, Iles Raiatea et Tahaa. 1ère Feuille. Ile Tahaa, 1885. Dépôt des Cartes et Plans de la Marine, Paris.

United States Charts.—No. 936, West Coast of Mexico. Tenacatita and Navidad Bays. Dec. 1885.—Nos. 955 and 956, North Atlantic Ocean, 2 sheets. Jan. 1886.—No. 934, West Coast of Nicaragua, San Juan del Sur. Feb. 1886.—Pilot Charts of the North Atlantic Ocean, for Jan., Feb., and March, 1886. Published at the Hydrographic Office, Washington, D.C., Commander J. R. Bartlett, Hydrographer to the Bureau of Navigation.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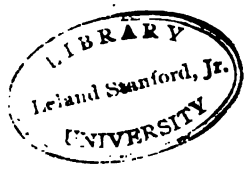
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AND MONTHLY RECORD OF GEOGRAPHY.

Recent Journeys in Korea.

By W. R. Carles, H.M. Vice-Consul, Korea.

(Read at the Evening Meeting, January 25th, 1886.)

Map, p. 352.

So much of the interest attaching to Korea is due to the ignorance of the country and its customs in which Europe has until quite recently remained, and to the incidents affecting those few occasions on which Westerns had been brought into contact with Koreans, that it seems desirable to refer briefly to her past history, so far as it has concerned other nations, before touching upon the present.

Of the Korean aboriginals scarcely anything is known, but there are historical records to prove that Korea was already inhabited in the twelfth century B.C., when Ki-Tze introduced from China the first elements of civilisation into the land. Both previous and subsequent to that date there had been occasional immigrations from Manchuria, which have left a strong mark on the people of to-day. At the same time, though the facial characteristics of the people greatly resemble those of the Manchu, there is great variety of feature among them. Jews, Japanese, and Caucasians all seem to be represented, and that not in separate districts, but in almost every town of any size, so that foreigners on their first arrival in Korea are little troubled by the difficulty which is encountered in most other Oriental countries in distinguishing one native from another. Some faces are almost destitute of hair, like those of the Northern Chinese; others exult in rich silky whiskers and beard; others are almost hidden in a coarse tangle of hair. Among the gentry it is by no means uncommon to meet almost an English face, with round cheeks, small aquiline nose, well-cut mouth and chin. Even a bright blue eye is not unknown, and the hair is by no means invariably of a pure black.

Though it is very evident that many stocks have been drawn upon to produce the Koreans of the present day, the seclusion in which the country has remained, except during periods of invasion by China or

Japan, has been marvellous. Almost the first knowledge that Europe obtained of the country was through some Dutchmen, who in 1653 were shipwrecked on the coast, where they found their countryman Wetterree, who had already been a prisoner there for twenty-five years. After fourteen years of confinement some of them escaped to Japan and thence home to tell of their adventures.

They were not, however, absolutely the first Europeans to set foot in Korea, for the missionary G. de Cespedes had taken advantage of the Japanese invasion at the end of the sixteenth century to introduce Christianity into the land.

The seeds which he sowed were not utterly destroyed by persecution, and a revival of Christianity took place in 1777, which was assisted by Chinese missionaries at different periods between then and 1835, when M. Maubaut at last succeeded in entering the country, after attempts had been made for over forty years by different foreign missionaries of the Church of Rome. The footing which he gained was improved by his successors, in spite of repeated periods of persecution, until, in 1866, the only three who were left had to flee for their lives, after thousands of their converts had been put to death. How cruel the persecutions had been will appear from the fact that three out of five bishops, and nine out of sixteen missionaries, had been martyred, and the majority of those who had escaped martyrdom had succumbed under the trials that their life had entailed.

The fate of her missionaries provoked France the same summer to send an expedition to avenge their death; but the resistance which was offered led to the withdrawal of the force, and almost at the same time an American schooner which attempted, treaty or no treaty, to make an opening of trade, was burnt with her crew in the river below Phyöng-yang. Once again, in 1871, an attempt was made, this time by the United States, to secure some security for shipwrecked crews in the future, as well as satisfaction for her murdered citizens; but again the resistance was such that no result was obtained, and Korea could again boast of having repulsed foreigners from her shores. In 1876 it fell to Japan to follow the examples of France and the United States; and as this time full means were taken to carry out the purpose, success attended the invaders, and at last treaty relations were established between a foreign country and Korea.

Of the half-religious, half-sacrilegious attempt which had intervened and been defeated, to the satisfaction of all foreigners except the missionary and adventurers concerned, I will not now speak; nor is it necessary to recall the events of the last few years, which have seen the Japanese Legation twice burnt to the ground, and in spite of these fits of anti-Japanese hostility, have led to treaties with the United States, Germany, Great Britain, Italy, and Russia, granting security for life and property to all foreigners in Korea.

The geography of the country is very simple. With a population of about 8,000,000 and an area of about 90,000 square miles, or very closely the same as that of Great Britain and Wales, Korea extends south from Manchuria in one large promontory, from the base formed by the rivers Amnok (Yalu) and Tuman. It is divided into eight provinces, or "Do," the names of which are taken from their two chief cities, e. g. Phyong-an is formed from the first syllables of Phyŏng-yang and An-ju; Chhung-chhŏng from Chhung-ju and Chhŏng-ju; Chol-la, by a euphonic change, from Chon-ju and Na-ju. Mountainous in the north, it is hilly in the south. At the extreme north lies Paik-to-san, the great mountain on which are the sources of the two rivers which form the northern boundary. With it are connected many myths and legends regarding the prehistoric times of the country. From it extends a range of mountains running north and south, which generally follows the line of the eastern coast at no great distance from its waters. This conformation has had considerable effect upon the country. The more extended slopes of the west are comparatively favourable for agriculture, while the slip which lies between the Japan Sea and the mountains is not only narrow but cut off from communication with the west by the precipitous character of the mountains on their eastern face. In the south, where the range trends inland, and the conditions no longer remain the same, Kyŏng-sang is one of the richest provinces in the kingdom.

A circumstance which tells against the prosperity of the east is the absence of rivers of any importance, and the scarcity of islands and harbours to afford protection to shipping. The value of such harbours as do exist is out of all proportion to their trading facilities, in consequence of their remaining open throughout the winter; and it is to this fact, and to the contrary being the case on the Russian coast of the Pacific, and on the shores of the Yellow Sea, that the importance of Port Lazaref is due. The rise and fall of tide along this coast is very slight; at Gensan only two feet, but from the south to the west its force rapidly increases, and at Chemulpo attains to a rise and fall of 38 feet. Whether due to this cause or not, along these shores are numberless islands, many of them so little detached from the mainland, as to have been frequently confused with it by navigators. The indistinctness of outline of the coast is further enhanced by the mud banks which extend far beyond the reach of sight out to sea. Their presence has sadly diminished the usefulness of the rivers for navigation. So greatly is this the case, that the native craft which come down the Nak-tong are said to have to tranship their cargo to other vessels for conveyance to Fusan, on account of the shallows at the mouth of the river; on the other hand, along the west coast, the great extent covered by the delta of the rivers, has to a large measure done away with the bars which might have been expected from the violence of the tide and the volume of the streams. The rapid rise and fall of the tide and the vast area

which twice a day is left bare by the receding tides, are the causes of frequent fogs which often are driven inland.

Of the rivers, the Mok-pho, the Keum, the Han, and the Tai-dong, though all alike important, give way before the Am-nok, which is by far the grandest river of Korea. Flowing through lovely mountain scenery, it has so many affluents, that in summer its waters rise full 40 feet, even where its width is a mile or more. In the time of its highest floods, the rafts of timber are launched which have been awaiting water-carriage in the mountains.

Lying mainly between the 35th and 40th parallels, the climate of Korea is greatly tempered during the summer by the sea breezes, which render out-door exercise quite possible, even when the thermometer stands at 100°. Such rain as falls is almost confined to June–September, and during the rest of the year the sky is bright and clear. In the winter, the cold even at Soul is very severe, and the river Han, though 400 yards broad, is frozen for three months sufficiently hard to admit of cart traffic. The chief products of Korea are rice, wheat, beans, cotton, hemp, maize, millets, and tobacco. The cultivation of rice is facilitated by the water-supply of the numerous valleys, which are barred across by bank after bank of mud from the head of the valley down to the sea. Fond as the Koreans are of society, they never seem happier than when in the early summer, gangs of men stamp in the rice roots, keeping time and line with their leader. With feet high poised, they wait the next note of the chant, whose echoes will soon be sung back to them from the hills, or returned to them from other gangs working in the distance. Studiously decent, even at such work they do not lay aside their clothes; and women who help their husbands in planting and weeding the rice fields, are reproached by their betters for their impropriety in tucking up their trousers to the knee.

Field after field of rice between low-lying hills, which in winter are scratched bare of tree and grass, present a monotonous prospect, which, as I have heard it described in Chöl-la Do, must be wearisome in the extreme; but in the northern provinces, with which I am familiar, there is never any lack of beauty, and in the spring there is an exquisite variety of flowers and grasses wherever the ground has been left untouched by the plough. Even in the more thickly populated neighbourhood of Soul, many groves of trees are spared out of respect for the tombs which they shelter, and the rounded outlines of hills of disintegrated granite are grandly broken by peaks of rock, which tower up, free from shrub or grass, 300 to 400 feet above their fellows.

Further north the character of the country gradually changes, until rice-fields are forgotten and give way to oats and potatoes, hemmed in between mountains whose sides are one dense thicket, except where clearings have been cut or burnt, and lack of terracing has brought down streams of detritus at the first summer storm. So wasteful has

been the system of wood-cutting, that along the main routes it is only occasionally that glimpses are seen of the beautiful woods which lie back from the roads. Trees, brambles, and weeds, all give way before the pressing need of fuel in the winter, and the result would be dreary indeed if the dead did not protect their groves.

There is much in the general features of the country to remind the traveller of the north of Scotland. Of this great part is due to the geological formation, which is mainly of primary rocks. In Hwang-hai Do are mesozoic rocks, but granite and metamorphic rocks hold the larger part of the country for their own. On the road between Soul and Gensan are oval fields of lava, one of which I suppose to be 40 miles long, and lava and volcanic rocks are found in the north near Wi-wŏn and Chhu-san. These fields of lava are generally surrounded for some distance on either side by conical peaks, showing that the area of disturbance must have been very wide. In Northern Korea it is seldom that the mountains open out wide enough to give an extended view, but from the centre of these lava-fields the panorama is very striking. Far away in the distance stretch range after range of mountains, while, for some miles round the spot on which one stands, the plain is so smooth and unbroken, that the eye is unable to tell in which direction the ground rises, though the slope over which the lava has flowed is in reality greater than that of a swift-flowing river. Where the lava-field meets the mountains a great chasm has been worn by the torrents. So deep are these encircling ravines, and so high is the table-land of lava, that the mountains seem to have been shorn of their bases, or else to have dropped through 100 feet and more of the earth's crust.

To describe a journey through Korea without first attempting to describe Soul would be vain, but the feat is no easy one. The city lies in a basin about three miles in diameter, the sides of which are cut down at the east and west, and rise 800 feet high to the north and south. Like Chinese cities, Soul has its battlemented walls of stone, and heavy gateways of woodwork and tile, studded with portholes, behind which cannon are supposed to be planted. But inside the walls the resemblance does not last. The first impression is that there are no houses, but only huts thatched with straw. From the broad main streets it is easy to look over the roofs of the whole city to the beautiful hills, clad with fir, which lie at its back and foot. Ten feet from the ground there is hardly an object to break the view, until the narrow tortuous lanes are entered, alongside which most of the better class of houses are built. They, too, are low, and from the outside show no sign of comfort, for the servants' quarters are ranged along the lane, and the better buildings are hidden from view. Sometimes through an open doorway a glimpse is caught of a pavilion of unpainted wood, raised two or three feet from the ground, with windows and doors of trellis-work filled in with white paper. The eaves project far over the sides, and perhaps in the east is a little balcony

running under their shelter. The courtyard is swept clean, and the neatness of the wood and paper is enhanced by the shining whiteness of the servants' clothes. Men are standing in the doorway in robes which reach almost to the feet. On their heads are conical hats of bamboo, split into little shreds and woven together so fine as to give free current to wind or rain. Every man has in his hand or mouth a pipe with a stem 3 feet long, fit to serve as an Englishman's walking-cane. On their feet are socks of cotton cloth and light straw sandals. Loose trousers, falling in a bag from hip to knee, are neatly bound round the ankle over the socks.

The quiet and cleanliness of this scene is widely at variance with what obtains in the streets. There bulls hidden under ponderous loads of brushwood block up the road; scores of tiny ponies canter along, with grinning urchins seated sideways on the empty packs; stalls of nuts, salt fish, turnips, chestnuts, brassware, pipes, pipe-stems, and all sorts of miscellaneous odds and ends, are planted at every corner and on either side of the road; and hundreds of foot passengers are making their way to and fro.

Hats of every kind and shape, except what one had previously conceived to be possible, are seen in every direction. There are black conical hats woven of split bamboo or horsehair, sometimes with wings projecting in front of the ears; white conical hats of wickerwork; Japanese parasols, of which children are the sticks; basket hats coming down to the ears; hats of straw-matting reaching to the shoulders; felt hats with broad brim and round crown, surmounted by a tassel or a bunch of plush; four-sided brimless hats of pasteboard; and, strangest of all, on top of the high conical hats is popped a little bee-hive covering of oil-paper, to protect them from the rain.

The women, of whom few are seen during the daytime, wear no hats at all. Their head-covering is a green mantle drawn over the head, leaving only eyes and nose exposed; if they are slaves their heads are bare, or perhaps girt round with coils of hair inches thick, which make a fine stand for such things as they are carrying. Their petticoats are worn very full at the hip over baggy trousers, and this fashion and the manner in which the mantle is held with both hands under the chin, give them an ungainly gait, though when without their mantles they carry themselves well. Their jackets are very short, and, unless the petticoat is pulled up round their bodies, the breast is left bare, but their bearing is far modester than their dress.

It is only, however, of the poorer class of women that I am able to speak at all, for the others do not venture out until after nightfall, when the men have to keep to their houses.

Spectre-like figures stalk through the streets in mourning robes of coarse hempen cloth gathered round the waist with a cord. A deep basket hat reaching to the shoulders, and a small screen of cloth held

on two sticks before their mouth, completely secure them from recognition, and the dress was accordingly adopted by the Roman Catholic missionaries, to whom disguise was absolutely necessary.

In striking contrast to their garb are the bright colours worn by the officials. Of the dresses worn by them, or their retainers, the gayest is of scarlet sleeves, yellow shoulder-pieces, and a bright blue body and skirt; but the court dress is comparatively sober, being generally of a dark puce colour, unrelieved by brighter colours. Sometimes a throat-lash of large red and yellow beads secures their hats. Of them some perched on high saddles clutch firmly to the peak, while their servants hold the reins and clear a way for their masters. Others are borne swiftly along the streets in covered chairs, so small as to render legs an inconvenience. Others are carried in arm-chairs over the backs of which are thrown tiger- or leopard-skins. Higher dignitaries still enjoy the privilege of riding on a monocycle, which is half carried, half pushed along the road.

While in the streets all is bustle and confusion, in most of the shops there is but little stir. The shopkeepers keep at the back of their premises, smoking a pipe while squatted on the ground, unless some particularly troublesome customer requires something which is out of their reach.

All visitors to Soul are greatly struck by the beautiful whiteness of the clothes in a city where drains are unknown, and the foul mass of decomposing matter lying on either side of the street is never cleared away except by a storm of rain, and then only to be carried to the streams, which flow through the town, and serve as washing grounds for the linen of the households.

Near the junction of the two main streets are shops of two stories, built of stone, behind which are little courtyards lined with tiny stalls like those in a street of old Cairo. Their occupants hold these buildings from the king, and in partial discharge of their duties to H.M., are bound to render onerous duties of attendance on the occasion of royal marriages, funerals, and the like. How onerous these duties are may be guessed from the fact that a royal funeral is regarded as almost as great a calamity to the whole country as a famine, from the heavy corvée imposed upon the nation.

The only buildings of any importance in the capital are the palaces, which are approached by wide streets leading to high gateways built in the Chinese style. The western palace is especially fortunate in the latter respect, as the street which leads to it is 700 yards long by 100 yards wide, and is flanked by the larger public offices. The main buildings in the interior are two large halls, built in the Chinese style, and a summer pavilion about 40 yards square, raised some 12 feet from the ground, on obelisks and pillars of stone, standing some 16 feet apart. A large pool of water at its side, planted with

lotuses, feeds a moat, across which light bridges of marble are thrown. Numerous courtyards, shut in by walls, contain the private rooms of the king and his family; while his suite and servants are quartered in buildings which flank the great squares in which the halls of state are situated. Among the ruins of a part of the palace, which was burnt down a few years since, stand a number of strange-looking chimneys which rise out of the ground uninjured and scarcely blackened. These owe their existence to the custom of building the chimney at some little distance from the house. The plan is rendered possible, as the heating of the rooms is effected by a chamber underneath the floor, at one side of which is the receptacle for fuel, and on the other, either an orifice by which the smoke escapes, or a flue to conduct it through the courtyard to the chimney.

This is not the only peculiarity of Korean domestic architecture. Another is the division of a house into winter and summer rooms. The latter are at the ends of the building, and are raised above the ground on corner stones which permit the air to circulate freely beneath the wooden floor.

The interior arrangements are like those of a Japanese house; doors and windows consisting of a light wooden framework, strongly papered on either side, which slides easily in grooves. The windows, which also serve as doors, are generally double, the outer one consisting of two battants opening outwards, and fastened back against the wall during the daytime.

The woodwork of the houses is very curious. It is on it that the whole house depends; but though the weight of the roof is very great, owing to the nature of the tiles employed, nearly a third of the value of the massive beams which support it is destroyed by their ends being pared away to fit them into sockets cut on the top of the upright wooden pillars. The brick or stone work between the pillars serves only to fill in the interspaces, and bears hardly any of the weight of the roof, which is often put on before the walls are built.

Another peculiarity about the structure of the houses is, that owing to the scarcity and high price of lime, the stones, of which the outer walls are built, are tied together with millet stalks, before the interstices are filled in with mud.

Of the mud cabins in which the poor people live, all that can be said in their praise, is that they are warm and generally have clean floors. The dimensions of the best rooms often do not exceed 8 feet by 6 feet, and the height is generally about 5 feet. The doors are 3 feet 8 inches by 22 inches, and the windows 2 feet by 18 inches. In such quarters as these I have often had to sleep with two companions, and we were blest, compared to the ordinary travellers, of whom I have seen seventeen sleeping in a room so small that heads and feet overlapped, and the floor was positively carpeted with bodies.

The longest journey that I made in Korea was in the autumn of 1884, when, starting from Soul, I followed the main road to China as far as Wi-ju, and thence continued along the north frontier to Wi-wön. At Wi-wön I left the Amnok-gang, whose valley had been pursued by the road so far, and crossed by Kang-ge over a high mountain range to Chang-jin. From Chang-jin the track followed the Sam-su river almost up to its source, and then by a sudden descent dropped into the level country near Ham-heung, and so past Yöng-heung to Gensan. From Gensan to Soul I took the ordinary route, which crosses the mountains at Ko-san, and continues almost due south past Hoi-yang and Kim-hwa to the capital. The distance covered was about 1000 miles and the time occupied forty-three days.

The road from Soul to Wi-ju is that which has for centuries been taken by missions from and to Peking, and along its course the Koreans have fought many bloody battles against the invading armies of China and Japan. It is eminently the high road of commerce north of Soul, as every track to the west of the mountains converges on this line, and Kai-söng, Phyöng-yang, and Wi-ju are three of the most important cities in the country after Soul. It was therefore with eager expectation of discovering some opening for British trade that I undertook the journey, and the disappointment was very bitter.

From Soul to Kai-söng the road passes across numerous valleys at the foot of low hills of disintegrated granite. These as a rule have been robbed by fuel seekers of all grass and undergrowth, and give a white or reddish background to the villages at their feet. On the hill-sides are numerous tombs, planted on greenswards, surrounded by a horse-shoe bank of earth and protected by groves of fir. Two or three roughly carved figures in stone and a rude gateway formed of a stone slab laid across two pillars are sometimes placed before the grave, but more usually the mound stands without any mark to identify it.

The Sam-keuk-san, or Three-horned Mountains, lie to the east, capped by sharp peaks of rock, on whose face is neither grass nor lichen. At their feet lies the hill-town, or city of refuge, guarded by priest-soldiers, whose wall is seen vainly attempting to reach the highest summit. Within its enclosure are granaries and temples, standing by the banks of streams, which flow through a beautiful park, whose glow of autumn maple is considered by Koreans to rival the spring beauties of the azalea-banks in the other hill-town which Soul possesses at Kwang-ju.

These hill-towns are found all over Korea, and are intended for the protection of the people of the cities in case of invasion or rebellion. Another relic of times of trouble remains in the beacons, which send their message every evening from all parts of the provinces to the capital, to certify that no enemy is off the coast and that all is quiet through the land.

A few miles beyond Pha-jun is the Im-jin-gang, a river 300 to 400 yards wide and with 25 feet depth of water. It is, however, like many of the rivers on this coast, at present only navigable for a short distance, on account of sand-banks.

Chang-dan is the only place besides Pha-ju of any importance on the road to Kai-sŏng, but villages of thirty to forty cabins are passed every four or five miles, and numerous dwellings nestle in dells and sheltered ground at the foot of the hill. Hidden behind a fence of wattle, they have little that is picturesque about them except the great gourds, whose weight threatens to cave in the roof on which they rest.

Kai-sŏng is a place of great importance in Korea, not only on account of its past greatness as the capital of the last dynasty, but as the site at which the cultivated ginseng is grown and prepared for the market. Of this root about 100,000 lbs. are exported annually, and the fees and duties upon it, which constitute the main source of the Korean revenues, amount to about 450,000 dollars. Even with all the restrictions that are placed upon its cultivation it is estimated that little more than a fourth of the export is through legitimate channels. That smuggling should be carried on to a large extent is no marvel, seeing that the duties on each catty of prepared ginseng amount to over 12 dollars.

The ginseng gardens are chiefly in the valley to the south of Kai-sŏng, and are protected by high fences against robbers. The plants, which require four years to arrive at maturity, are grown under screens to shelter them from the sun, and need constant attention and frequent transplanting.

The cultivated root commands, however, a far lower price than that of the wild plant, which grows in the Kang-ge Mountains. So difficult is it to find this that the people credit it with magic properties, and assert that only men of a pure life can see it.

Much harm is undoubtedly done throughout Korea to honest labour by the rich rewards which await the lucky in other lines; and time which would be well spent in the fields is constantly wasted in the search for wild ginseng, deer-horns, and gold-dust.

The population of Kai-sŏng is somewhat over 30,000, but its trade is insignificant, the chief native products consisting of coarse pottery, fine matting, and oil-paper. The crops are of rice, wheat, beans, maize, millet, cotton, sesamum, perilla, tobacco, chilies, cabbage, and potatoes.

Between Kai-sŏng and Hwang-ju the geological formation is different to what I have seen elsewhere in Korea, embracing limestone, gravel, pudding-stone, and, as I fancied, occasional fields of loess. The land is more open and better suited for cultivation, and the woods that are left are more varied in character than is the case between Kai-sŏng and Soul. It is also said to be one of the best shooting grounds for pheasants in Korea.

It is to the coast of this province (Hwang-hai Do) that great fleets

of herring-boats cross over from China. The fishermen are allowed to dry their catch on the shore, but no intercourse is permitted between them and the natives.

One of the most beautiful of the woods on this road lies on the descent towards Hwang-ju, from the hills behind Pongsan. Dark firs, mixed with oak and alder, are relieved by the bright tints of the maples, the crimson-leaved rhus (*R. semipinnata*), and the coral-coloured berries of euonymus. Delicate lime-trees and brown-tinted hornbeams are closely shrouded in veils of clematis, while silver-tinted bushes of elæagnus and bunches of mistletoe increase the variety of foliage. Here and there are fine ash-trees, and most beautiful of all for its growth is the *Acanthopanax ricinifolia*, which grows 40 feet high and spreads out its branches, apparently quite unhindered by the thick growth around it.

Hwang-ju, which stands 13 miles from the sea, is only important as the residence of the general in command of the troops of Hwang-hai Do. Like all Korean towns, it is beautifully situated. At its back, stands a hill which is partially wooded, and along the crest of which runs the city wall. At its foot is the river which flows close to one of the gates, and the official buildings are all collected on ground which overlooks the city and commands a view of the plain beyond.

From An-ju to Phyöng-yang, the country was remarkable for the richness of its soil. Almost the whole length of the road (100 li) ran through a plain, marking probably the ancient mouth of the Tai-dong river. The villages were hidden in little hollows sheltered from the wind, and beyond the plain stretched what appeared to be a great amphitheatre of mountains embracing the cultivated land.

For about two miles before reaching Phyöng-yang the road was lined with *seun-tjeung-pi*, the slabs which are erected to officials by the people in recognition of their merits. These slabs were of stone or iron, and in many cases were housed-in. Groves of sophora lined the river, interspersed with gleditschia, whose long pods hung waiting for the day when some Ning-po man will teach Koreans how to make soap, and how to use it. It is to be hoped that the slab to his honour will not be the smallest on the road.

Of Phyöng-yang it is difficult to speak briefly. It is by far the most interesting and perhaps the most beautifully situated town that I have seen in Korea. What Shakespeare is to Stratford, and King Alfred was to England, Ki-tze was to Korea and is to Phyöng-yang. Though he lived 3000 years ago, his memory is fresh in the name of every part of the city. His grave is kept in good repair, his portrait hangs in a shrine dedicated to his memory, and the standard of land measurement which he introduced is marked out by the same roads and dykes that he traced out.

If there are some who will question the genuineness of these relics they will at any rate not deny the events of more ancient history of

which Phyöng-yang has been the scene. Fierce have been the battles raged under its walls, and it might have remained in Japanese hands until this day, had not the god of war shown himself with his battalions and driven the foreigners away. A beautiful temple has lately been erected to his honour, here, as in other parts of the country; and the siege of the city is portrayed in frescoes, in a hall where hang the portraits of the generals of the allied Korean and Chinese forces.

The interest of the city has not died out in later years, for it was in sight of her walls that the *Gen. Sherman* was burnt with all on board, leaving their fate a mystery for many years.

Phyöng-yang has a population of over 20,000, and is the only city which impressed me favourably regarding capabilities of trade. It is only 36 miles from the sea, to which it has access by the Tai-dong river. The visit of the *Gen. Sherman* seems to settle the question of its navigability up to the city by light vessels; and higher up there are two streams by which produce can be brought down from a considerable area. Apart from the large bean and cotton trade of the province, some of which finds its way at present to Newchwang, there are gold washings at Keum-san, about 20 miles off, and rich iron ore close to the river banks at Kai-chhön. The city is the centre of a silk industry, which is said to be considerable, drawing upon Thai-chhön, Yong-pyon, and Söng-chhon for its supplies. The cattle are very fine, and but little teaching is required to greatly improve the condition of the hides, of which the export at present is from Chemulpo, a port 170 miles off. Added to this, the people possess the spirit of trade, and are anxious for opportunities of foreign commerce.

Between Phyöng-yang and An-ju, there is little to note, except that the increased width of the road denotes greater traffic, which continues as far north as Wi-ju.

An-ju owes its importance chiefly to its strong military position commanding the roads north and south, and resting against a hill, of which the northern face would be difficult of attack. The Chhöng-chhon-gang, which flows close to its walls, is a river of considerable width, but shallow except in summer floods. Enormous numbers of wild geese were feeding on the banks near its mouth.

As the road advances north from Phyöng-yang, the width of the valleys decreases, and spur after spur of the hills has to be crossed or rounded. Evidence of a colder climate is seen in the more frequent cultivation of hemp, and in millet and maize largely taking the place of rice. The country is perhaps even more picturesque than previously, except for a few miles north of Yöng-chhon. Ko-san and Kwak-san are especially remarkable, and when the valley of the Amnok opens to the view, the scene is exceedingly lovely. Woods all ablaze with maple stretch to the left towards the sea; in front is a wide plain, traversed by an avenue of trees four miles long, leading to Wi-ju. The town is

perched like a castle on a hill. At its base flows the grand current of the Amnok, and to north and east are mountains, which stand out in bold relief to the tameness of the foreground.

Wi-ju is said to have a population of about 30,000, and is the great depôt of all goods sent by the overland route to China. Until recently, a large strip of territory intervened between the two countries, which was regarded as neutral ground, not to be occupied or cultivated by either Chinese or Korean. In 1875, this land, to which many settlers had found their way, was incorporated into Manchuria by China, and a regular system of government has been established in it. Even at the present day, however, the only points at which communication between the two countries is permitted, are Wi-ju on the west and Kyŏng-heung on the east. The trade that I found at Wi-ju was astonishingly disproportionate to what might be expected from such a state of things. On the river bank were 19 boats, the largest of which carried 10 piculs or half-a-ton; a string of salt fish was being carried away from the custom-house, and a few baskets of shrimps were on their way there. On the ferry boat were but three passengers, and the track on the opposite shore had not even been trodden hard. In spite of this state of things, and in spite of assurances to the contrary, I cannot help believing that the old system, under which trade between the two countries was only permitted at markets held three times a year, has not yet been entirely broken through, or that at any rate old habits are stronger than systems.

The river is not seen at its best near Wi-ju, as a little distance above the town it divides into three branches each about 250 yards wide. The boat traffic on it is entirely in the hands of the Chinese, who carry up supplies to colonists on the north bank of the river; but advantage is taken by the Koreans of the summer floods to float down enormous rafts of timber from the mountains east of Chhu-san. Of the volume of these floods, an idea could be formed from the drift caught in branches of trees 40 feet above the river, in parts where it was three quarters of a mile wide.

From Hwang-ju to Wi-ju the road runs at no great distance from the coast, though a view of the sea is only obtained by climbing some of the higher hills in its neighbourhood, and the ridges crossed are all low, in no case exceeding 600 feet. But turning inland from Wi-ju, the country gradually becomes more mountainous. Stream after stream is followed by the road to its head or descended to its junction with the Amnok. The crest of the mountains is topped by a ledge of rocks, which generally runs along the whole length, and affords a pathway for hunters or game, but is too narrow for traffic. The steep faces of the hills admit of little cultivation, and where an attempt has been made, the detritus has quickly poured down and ruined the plots of better soil beneath. As no terracing has been done to prevent this

waste, the streams sometimes have to force their way through 18 to 20 feet of moraine-like matter; and so full of stones is the ground, that the bulls which draw the plough are attached to a yoke wide enough to allow the ploughman to see the dangers ahead.

The people seem to have been discouraged by their ill-success, and were extraordinarily listless, sitting smoking in their houses when their crops were waiting to be carried, and leaving a large share of the out-door work to the women of the household. The streams abounded in small fish, for which bag traps were set, and fine fish were easily procured from the Amnok by net or line.

Occasionally the road ran along the bank of the Amnok through maple woods, where the undergrowth was almost impenetrable, but excepting at these places the scenery was rather monotonous, being generally confined to the valley of some affluent of the big river. Of the beauty of the Amnok it would be hard to say too much. Its width of half a mile and more, the extraordinary clearness of its waters, the absolute quiet, and the absence of life, except where a flock of ducks are playing on the water or a fleet of boats are working slowly up stream under the cliffs of a mountain on the opposite shore, make a picture that charms the traveller without fail.

The marches were long for a hilly country, and we were generally benighted, but the pony drivers seemed rather to enjoy what would elsewhere be a disaster, for the villagers were generally awaiting us with bundles of reeds, which they used as torches to guide us on our way until we reached the next relay. The blazing torches and the excitement of travel by their light cheered up men and beasts, and one dark night over 10 miles were covered in three hours, in spite of rocky ground and of a 30 miles' march by daylight.

Near Wi-wŏn the road left the Amnok and struck across the hills to the Kang-ge river, which is one of its affluents. The ranges crossed up to this point had gradually increased in height, rising at the last ridge before Wi-wŏn to 1250 feet, but there was no perceptible difference in the level of the river, my aneroid showing 29·70 at the place where the Wi-wŏn river joined it. The country between Chhu-san and Wi-wŏn shows considerable traces of volcanic action in tufa, &c., and opposite Wi-wŏn is a hill greatly resembling a volcano, which I had not time to explore.

The last 10 miles before reaching Kang-ge were very bad travelling. For a long distance the road ran through boulders and over slippery ledges which sloped down to the river. The ponies found it almost impossible to keep their footing, and two or three slipped into the stream. The drivers were in despair over the difficulties of the road and gave way to tears. Rain fell heavily and the night closed in early, but the stolidity of my Chinese servants was proof against everything. Mounted on their rolls of bedding, they stuck to their ponies or fell in

with them, and showed little discomposure. They certainly were excellent servants for a journey. One of them, it is true, was by nature almost a cripple, but he stuck to me gallantly, though he was at daggers drawn with his fellow, and became later on so home-sick as to refuse food for two days and to cause me serious uneasiness. Fortunately at Gensan he met some friends who comforted him with wine and oil and reconciled him to his food, but I fear that he subsequently succumbed to consumption brought on by exposure.

Two of my ponies had broken down before reaching Wi-ju, and at Wi-wŏn one of the drivers became quite knocked up. It was impossible to leave him there and impossible to send him home, and a day's rest and half a bottle of whisky were needed to set him on his legs again. None of us indeed were sorry to rest, for since leaving Wi-ju we had travelled nearly 235 miles in eight days, and that over hilly ground.

From Kang-ge (bar. 28·78) the ascent was very constant. Snow fell the whole of the first day out and hid the country almost completely from view, but the next morning was clear, and found us on the outskirts of a virgin forest (bar. 27·47). The snow was knee-deep, and had not been trodden. Branches of trees, weighted with snow, barred the path. Trunks of trees lying across it frequently necessitated wading up a stream, and the cold became more and more intense as the day grew older. But nothing could rob the forest of its beauty. Birch, rowans, oaks, and maple were for some distance the commoner trees. Magnificent *zelkowas* were seen here and there out-topping all their comrades, but the finest seemed to have suffered greatly from the storms, and one monster, whose stem was 2 feet 6 inches in diameter 50 feet from the base, had fallen across the track, where it had been sawn in two, as too large to clear away. The forest was almost impenetrable from the number of dead trees lying on the ground, and scores had been felled to form bridges over the streams, on which traps could be set by fur hunters. Nearer the crest of the mountain (bar. 24·84) the woods were entirely of fir, which grew 130 to 150 feet high, with perfectly straight stems. As their branches were bent down to their sides with the heavy weight of snow upon them, they were quite unrecognisable, but from cones sent to Kew they have been determined to be the *Abies microsperma*.

Not a soul was met, and only one cottage seen on 20 miles of this road, but after leaving the woods on the east slope a few villages were found in the plateau near Chang-jin (bar. 26·77). The population a few years since was greater, as silver-mines were at that time worked there with success, but latterly the quality of the galena has fallen off, and the ore is now sold as lead to the mint in Soul.

From Chang-jin I followed the Sam-su river for three days, until I reached its source in the mountains above Ham-heung. A large part of the country was open, and looked well suited for pasture, but the people

complained bitterly of their poverty, relying as they did entirely on their crops of hemp, oats, potatoes, turnips, and cabbage. The snow, which lay deep on the ground, had buried a large part of the harvest, and it was probable that nothing could be done in the fields before May. Such produce as was being moved was drawn on sledges, but few people were stirring, and in the winter, they said, they never left their houses, except to collect fuel or keep open the road. The houses were, however, generally more comfortable than in other parts of Korea, and many immigrants had been tempted by the cheapness of the absolute necessaries of life to try their luck there as colonists.

Bears, tigers, leopards, and deer were said to be numerous, but, strangely enough, wolves are unknown in Korea, though found to the north of the Amnok.

While crossing the plain, two or three gold washings were passed, at which a few hands had been employed during the summer, but the work seemed to have been of a fitful character.

The ascent to the crest of the ridge (bar. 26·10), overlooking Ham-heung, was very gradual, through woods of fir, laden with long streamers of lichen. The south face was very steep, and commanded a beautiful view of the plain between it and the sea, while to right and left stretched grand mountains which hemmed in the plains with an almost precipitous wall of rock. The descent was very rapid, falling from bar. 26·10 to bar. 28·78 in less than three hours, and on the following day we reached Ham-heung (bar. 30·05).

The journey from sea to sea, or more correctly speaking from Wi-ju to Ham-heung, occupied sixteen days (Oct. 14–29), being in length about 410 miles. There is said to be another route from Wi-wön east to Hui-ju and Tan-chhön, both of which are interesting on account of their minerals; but south of the line which I followed, the valleys generally run north to south, and thus oppose so many obstacles to any one wishing to cross them, that there are said to be no other roads running east and west above the latitude of Phyöng-yang.

After the rude villages of the mountains, Ham-heung with its 3000 houses had a most imposing appearance, approached as it is over a bridge nearly 400 yards long. It has, however, no trade of any importance, except in hempen cloth, which is of very good quality, furs, beans, and hides.

The mode of separation of the hemp fibre is, according to the description given to me, different to that obtaining in China. At the bottom of a large pit paved with stones, large stones are placed which are heated by a fire at the side. Bundles of hemp are pressed down on the stones and kept in position by stakes, the heads of which are above ground. On the hemp, piles of grass are thrown, and the grass is closely covered with earth, until the pit is air-tight. The stakes are then withdrawn and water is poured in through the holes left by them.

The water falling on the stones produces a dense steam, which in about twenty-four hours leaves the hemp ready to be pulled to pieces.

The fringe of country west of the road from Ham-heung to Gensan, which lies between the mountains and the sea, is little over 30 miles in width at any part. A great portion of it is very flat, and much harm had been done by heavy rains. A large portion of the rice crop had been ruined and the people were looking forward to a famine before the winter had passed. The population is, however, not exclusively agricultural. Pottery works exist in several places; gold-washings of an extensive nature are carried on at Yŏng-heung and on a smaller scale at Chong-phyong; north of Yŏng-heung is a bed of graphite, of which the boxes of cart-wheels are made; and, as is the case throughout the Phyong-an and Ham-kyŏng provinces, a small quantity of silk is produced by the women.

Gensan, with its neat streets of Japanese houses, well-kept bridges and pier, is a most astonishing surprise in Korea. The surprise is increased by the distance of the town from the foreign settlement, and by the almost complete absence of shipping, facts which at first sight make its existence at all a matter of wonder. But its position at the entrance to Port Lazaref has encouraged hopes of trade from abroad, and the market in the native town has a sufficient stock of grain, furs, and fish, coupled with an export of gold-dust, to induce Japanese traders to settle there. So far, however, only three or four Chinese had followed their examples, and no Europeans had yet been attracted there, except the staff of custom officers in the employ of the Korean Government.

On leaving Gensan, the first object of interest was the traces of volcanic action in the rocks, and the existence of a field of lava 20 miles long by 10 miles wide. On crossing the mountains near Ko-san other fields of lava were found beyond Hoi-yang and Keum-sŏng, and even as far as Kim-hoa many of the stones in the brooks are of lava. The rivers have cut their way over 100 feet deep through this mass, but the action of the atmosphere upon its surface has been very slow and the greater part of the plains have still too little soil upon them to permit of cultivation.

Of the extent of this volcanic field I became more fully aware in the spring of 1885, when on a journey to Phyŏng-kang, I found two other fields of lava. The first of these is in the Yon-chhŏn district, and is about 10 miles long by four miles wide. The second reached from the neighbourhood of the town of Chhŏl-wŏn to the extreme border of the Phyŏng-kang district, and as far as I could calculate was 40 miles long by about 10 miles wide.

In each case the features were the same; a large plain covered with grass was surrounded by precipitous ravines, through which ran rivers at the base of the mountains, to which at one time the lava undoubtedly

extended. In the centre of the Ko-san plain is a pool about 300 yards long, which is the only one that I have seen in Korea. As it was situated on the highest part of the field, the question has since occurred to me whether it might possibly have been the mouth of a crater.

Between Hoi-yang and Soul the road is very pretty, running between high mountains, which are in high repute among the natives for the gold-washings that are found in these streams. Many signs of workings were seen even from the road, which, as the summer floods wash away the banks that are thrown up by the gold-seekers, must all have been of quite recent date.

The road from Gensan to Soul is important as one of the great lines of commerce between the east and west coasts, but the traffic seems to be confined to copper, galena, hides, fish, and tobacco from the east, and foreign shirtings, watches, and miscellaneous foreign and native articles from the west.

The number of travellers when I came by it was considerably decreased by the disturbed state of the country near Hoi-yang and Ko-san. Several parties were met who had been robbed of everything that they possessed, and no resistance had been made to the robbers, who were said to go about in parties of thirty, armed with matchlocks. Neither here, however, nor elsewhere, was I in any way molested, and the temper of the common people seemed very favourable, while the conduct of many of the officials had been most courteous and friendly.

My first journey in Korea was made in the early winter of 1883, at the time that a treaty between Great Britain and Korea was being negotiated by the late Sir Harry Parkes. In spite of the fact that our party of three had no right at the time, under treaty, to travel in the country, and that foreigners in foreign garb had hardly been seen in the interior, the greatest civility was shown us by officials and people alike.

The part of the Kyong-kwi and Kang-wŏn provinces which we visited was said to be the richest in Korea for minerals and game, but proved disappointing in both respects. Later on I learnt that its reputation for game was not undeserved, and that it holds tigers, leopards, mountain antelopes, and several kinds of deer, while pheasants, bustard, geese, and swans are to be found in considerable numbers. But at the time we almost discredited the existence of big game, except in one place, where a woman had been carried out of her house by a tiger the same day that we arrived. It seemed impossible to believe that, at the same time, tigers could be so plentiful as to commit, as we were told, almost nightly raids on the pigs and dogs of the villages in which we slept, and that the villagers would be so apathetic as to disregard our offers of lavish rewards if we were shown big game. As to the hunters who were to find us tigers, after a time our only care was to secure ourselves from their matchlocks. But game existed, as I afterwards discovered for myself, and the real difficulty in the way of securing good shooting is

the necessity of speaking Korean, and knowing the country intimately, so as to organise the hunt oneself, in such a manner as to suit fire-arms.

The manner in which big game are shot by Koreans requires great nerve in the sportsman, for the gorges are driven upwards by a large body of men, and the guns are stationed at the head of each defile, sometimes behind a rock, but more frequently behind a screen of brush-wood, and the cover is so thick that neither the game nor they are aware of each other's presence until scarcely thirty yards apart. A man told me, however, that he had shot over thirty tigers stone dead without receiving a scratch himself, until the last occasion, when he had been considerably mauled, and his matchlock broken to pieces.

Curiously enough the same words, *pŏm* and *horang*, are used to specify both tiger and leopard. The latter animal is said to be the more savage of the two when wounded. But it is the tiger which appears on the standards of the troops and in paintings as the emblem of valour, and the tiger's skin is the more honourable as the insignia of office. Tiger's bones too fetch the higher price as a specific for courage and strength. A Chinese gentleman in Soul bought the whole carcase of a tiger and ate its flesh for the same object, but I am not aware that the custom obtains generally in Korea. The tiger appears to be of the same species as the Manchurian, with longer hair than the Indian tiger, and measuring, it is said, sometimes 13 feet. The largest that I have measured was 11 feet 10 inches and the largest leopard 9 feet 6 inches.

By the hunters or *paoshus* themselves the danger of attacking the larger game is fully recognised, and a man who has not the pluck to pursue them will not hesitate to state the fact. The arms used are most inadequate, consisting of a matchlock lighted by a slow match from a cord which is wound round the arm, and the balls, of which there are three to a charge, are little larger than a pea and imperfectly rounded.

The prize which is most coveted by the hunters are the horns in velvet of the large deer. These in July and August are at their best for the market, when a good pair will sometimes fetch 50 to 60 dollars. I have never seen this species of deer myself; indeed, I think that the hunters were unwilling to put me on its track, but it is by no means rare on the higher mountains of Kang-wŏn Do. The horns are about 3 feet long each, and the footprint is like that of a red-deer. Besides it there are a species of Axis (*maculata?*), a larger deer resembling the *Pseudaxis mantchurica*, the *Hydropetes inermis* (the common deer of the Shanghai plains), a musk deer, a kind of roe, and the mountain antelope.

The fauna of Korea is undoubtedly very considerable, and besides tigers, leopards, bears, includes pigs, tiger-cats, badgers, foxes, beavers, otters, and several species of martens, among which is a sable, whose skin is of small value.

The number of birds is very large, as the position of Korea attracts

many migratory birds to make it a stopping-place on their travels. Eagles, among which is a large black kind, are very numerous, even in the neighbourhood of Soul. Buzzards, harriers, peregrines (largely used by the natives for hawking), sparrow-hawks, kestrels, and falcons are among the commonest of the Raptores. Swans, geese, mallard and mandarin duck, common and spectacled teal, afford very good shooting in the winter. Bustards are by no means rare, but very difficult to get near. Imperial cranes, ibis, herons, and egrets are common in the rice-fields. Curlew, godwits, redshanks, double, single and solitary snipe, and woodcocks seem to breed in the country. The large halcyon kingfisher is little rarer than the brighter kinds. Woodpeckers are numerous. Among them is a large black species with a red spot on its head and white marks on its body and wings, which may perhaps be the same as the *Troponax richardsi* of recent discovery. Of the smaller birds I am quite unable to speak, except as to the number and variety which pass through Soul in April.

But to return to my journey. Though a few towns such as Hoi-yang, Kim-hwa, and Keum-sŏng, are marked on the map as existing on this route, they are little more than the residences of the local authorities and places at which travellers can stop for the night. The valleys are so narrow as to admit of little cultivation, and fear of wild beasts prevents farmers from occupying land in the mountains, whose recesses are only known to the miners. Their work is frequently seen in gold washings, and galena and copper mines are found in several places. The largest gold-washings in the district are to the west of Phyŏng-kang, where about 500 men were at work last spring, but there, as elsewhere, the reports were not very encouraging.

Though this is the district in which most mines are to be found within a limited area, they are also scattered over most of the provinces. By far the richest copper-mines of Korea are said to be in the Kap-san district, but the production of copper is insufficient for the needs of the country, which imports copper and spelter in large quantities. So small is the out-turn of silver, of which Chang-jin was one of the most famous centres, that almost all the "shoes" on the Soul market bear the stamp of Manchuria or Shan-tung. The richest gold-mines that are worked at present are in the Yŏng-heung district, but so small is their out-turn that Gen-san, which lies quite close to it, only exported 80,000 dollars' worth in the first ten months of 1884. The greater part of the gold which is exported finds its way to Japan; the mint at Osaka received in 1882–3 over 13,000 oz., and in 1883–4, 21,630 oz. of dust, the average fineness of which was 788·2 per mil. Of the gold received at the mint, a portion consists of ornaments sent there to be melted down, but gold ornaments are very little in use, except as clasps for the cap or filigree vinaigrettes.

Of iron there are traces in many places, but the best mines are

probably at Tan-chhŏn in Ham-kyong Do, and on the banks of the Tai-dong river above Phyŏng-yang.

It is, however, early to speak of the mineral wealth of Korea, and as the part between Soul and Gensan lies close to an area of volcanic disturbance of vast extent, and has apparently itself been affected by it, it is not impossible that it may be rich in ores. Of its beauty there can be no doubt, and though I have never visited Keum-gang-san, the mountains to which Koreans award the palm of loveliness, the country near it, seen even in its winter garb, was only rivalled by parts of the woodlands bordering the Amnok-gang.

Travelling in these mountains is far from luxurious, but its hardships are not unaccompanied by retrieving merits, and seldom have I seen a quainter sight than the yard of a farm at night. The sheds in which our animals drank up their mess of beans and hot water, ran round three sides of a square, in the centre of which blazed a bright fire to scare wild beasts and robbers. Round the fire sat some half-dozen Koreans, totally regardless of the intense cold, chattering and smoking, and occasionally replenishing the flames with a pile of reeds or brushwood which sent up a blaze of light the moment it was kindled. Squatted as they were on a manure heap, they seemed, with the bright stars above them, to be more favoured than we in our low kennel, poisoned with cakes of salted beans which hung from every rafter. Now and again the silence was broken by the screams of a fractious stallion, biting and kicking his neighbours, who in their turn plunged and squealed, until blows had brought them into order. How such nights of sleeplessness and riot brought any refreshment to man or beast seemed a marvel, but in the morning there was no sign of fatigue, except in those unfortunate persons who had slept in the foul atmosphere of the heated hovels.

Considerable care was taken of the ponies by their drivers. As soon as the packs had been removed, the animals were rubbed down, and after they had been cleaned, a thick blanket of straw was tied close to their bodies. Sometimes when the stable was very crowded, or the ground very deep in mud, a rope was passed from over the rafters underneath the belly in such a way as to take part of the weight of the body off the legs, and the care that was given to the cooking of their beans almost equalled that bestowed on their master's dinners. The latter point struck me greatly, as the manner in which the food was served up for the men was far superior to that seen among the same class even in Europe.

Before closing this paper it seems necessary to advert to the religion, trade, and some of the other main characteristics of the country.

In spite of the great admiration which Korea has always professed for Chinese institutions, and to her adoption of competitive examinations for the selection of officials, caste has a great hold in the land. The distinctions between the nobles and the middle and lower classes are very wide.

No office of even local importance can be held except by nobles, and in the higher posts in the capital it is the exception to find a man of even the second grade of nobility. Trade or industry disqualifies nobles and their descendants for the privileges of their rank, and fear of this degradation not unfrequently produces the most absolute poverty without any possibility of relief, except in the chance of obtaining office. As its conferment generally goes by favour, and empty purses are the worst recommendations for office, the condition of these men, who prefer to starve rather than place their children in an inferior position to that of which they themselves have been born, is pitiable in the extreme.

The middle class is comparatively small, and consists of doctors, painters, interpreters, scribes, and the lower officials.

The lower class includes all who are engaged in manual labour of any kind, while far below all others are the butchers and tanners. As this class possesses no privileges, it is upon it that falls almost the whole cost of the administration of the country.

Religion as a stimulating influence seems to have no existence in Korea. Of superstitious observances there are many, mostly the outgrowth of Taoism. Shrines to the spirits of the mountains, with cairns to which stones are added by passers-by, stand at the top of almost every ridge crossed by the mountain paths; trees and bushes often have their branches laden with cotton streamers; stones or fossils of unusual shape are placed in the shrines; and where hollows have been worn by the weather in sloping rocks by the roadside, every little cavity is frequently occupied by a stone placed there by suppliants for a fair journey; grotesquely carved wooden figures, called syou-sal-maki, are erected at the entrances to villages to ward off evil spirits; and Taoist priests offer prayers, for a consideration, on behalf of wayfarers, to the spirit of the mountain by which their road lies.

The philosophy of the country is Confucian, and great restrictions have been placed upon Buddhism; but in spite of all penalties imposed, its followers are very numerous, and on crossing over the hills, away from the main road, it is a common thing to come upon Buddhist temples hidden away in a ravine, with perhaps a large figure of Buddha carved in the natural rock overlooking the temple.

Evidence of some other religion exists in the *miriok*, which are half-length human figures carved in stone. The largest of these is at Un-jin, near the Keum river, in Chöl-la Do. From a photograph taken by Lieut. G. C. Foulk, U.S.N., the body and head of the figure, which is estimated to stand 62 feet high, appear to be drawn on the model of the idols in Buddhist temples, but the cap is quite different. A column about 10 feet high runs up from the head, and supports an oblong slab of about the same length. On this stands a smaller column supporting another slab. From the corners of the two slabs bells are pendent by chains.

The largest miricks that I have seen are between Ko-yang and Pha-ju. They are about 25 feet high, cut out of some large boulders in the heart of a fir-wood on a hill-side. One has a round, the other a square hat, showing, according to Mr. Aston, that "the former is meant to represent Heaven, or the male element of Chinese philosophy; the latter Earth, or the female element."

The trade of the country is at present insignificant. In 1882 the total of imports and exports amounted only to 3,467,325 Japanese yen, the principal exports being beans, peas, hides, and cotton-cloth. The best of their manufactures are paper (which of its kind is superior to that of Japan or China), mats woven of grass, split bamboo-blinds, and oil-paper. The wealth of the country from a Chinese point of view lies in its drugs, which are valueless in a European market. Many causes have combined to hinder the development of the country. Among these may be reckoned ignorance, insecurity of property for the poor and consequent lack of inducement to work, caste prejudices against working up leather or utilising skins of beasts for dress, and a preference generally for agricultural life to that of an artisan or manufacturer. To these have to be added a debased coinage, so cumbrous that a pony cannot carry more than 10*l.* worth, and in addition a multiplicity of guilds and corporations, which exist on a subdivision of trade which is quite ruinous to the country at large.

The domestic animals in Korea are very few. Its cattle are excellent; the ponies are very small, seldom exceeding 12 hands, but hardy and well-bred; the fowls are good; but goats are rare, sheep, tame ducks, and geese almost unknown, and the pigs smaller and worse than I have ever heard of.

Before the paper,

The CHAIRMAN in introducing Mr. Carles, said that the writer of the paper after passing a competitive examination and receiving an honorary certificate, went out to China when he (Sir R. Alcock) was Her Majesty's Minister there, and he had fully justified his early promise. He was now Vice-Consul in Korea, where he had lived for fifteen months. Those who were not experts in geography simply knew of Korea as a peninsula to the north of China from which Western nations had been more carefully excluded than even from Japan. Absolutely nothing was formerly known of the people or their customs, or of the physical geography of the country. Mr. Carles, however, had had the enviable opportunity of being a resident there for a sufficient time to be able to give a clear account of the customs of the Koreans. It was only during the last very few years that it had been possible to make any treaty with them, all the previous attempts to approach their coasts having proved fatal. One American vessel which adventurously penetrated into one of the rivers was burnt with all the crew. The French missionaries had obtained a good many converts, but the persecutions were so furious that most of those who passed the frontier never came out again. Even of late years persecutions had raged, and it was said that 8000 converts had been massacred. That was a sign that the missionaries had made some impression upon the people, though no one could live in safety who attempted to

lead the people to Christianity. The Americans, the British, the French, and the Russians now had treaties with them.

After the paper,

Mr. M. Brazeley, C.E., said he had never been in Korea though he had lived for ten years in China. In 1883 he had the pleasure of crossing the Pacific from Yokohama to San Francisco with the Korean ambassadors to Washington, who formed the first Embassy that had ever left Korea. Through their Chinese interpreter he learned a good deal about Korea. He particularly inquired about the mineral resources of the country, but he was assured that there would be very little return to any foreign Power that attempted to open up the country. Very good tobacco was grown there as well as silk, but the principal wealth for export was timber. He also learned that backgammon was a Korean game. The board is divided and arranged exactly like ours. The men are placed in the same order, and the moves are identically the same; the only difference being a single move for doublets instead of a double move as with us. It is very singular that this game should exist in Korea, as it is unknown in both China and (he believed) in Japan. He had mentioned the pleasure he felt in crossing the Pacific with the Ambassadors, and it certainly had never been his good fortune to meet with more agreeable and intelligent travelling companions than these Korean gentlemen.

Mr. Forbes said that as Korea had been shown to be a poor country, the only interest attaching to it was in connection with its strategical position. As an American he congratulated Great Britain on having secured Port Hamilton.

The Chairman said he once met with a French officer in China who had a strong opinion that Korea was rich in minerals, especially gold, but there could be no doubt that it was a very poor country. There was one feature in connection with the Koreans which entitled them to respect. They had shown a very courageous spirit of independence, and had resisted the attacks of both China and Japan. At one time the latter country conquered nearly the whole of Korea, yet the Koreans had managed to maintain their independence. Miss Edgeworth had said that in social relations the great matchmaker was propinquity, but propinquity did not always lead to alliances or friendships in the case of nations. Powerful nations like China and Russia were now seeking alliance with Korea, but no one could say whether the match would be a happy one or not. The chief interest in Korea seemed to arise from her position at the entrance of the China Seas, which would make her of inestimable value to more than one European nation. Physical geography had much to do with the policy of governments, and people were apt to forget that there was perhaps a sort of necessity for some nations to spread out in one direction more than another. During five or six months of the year all the ports of Russia were ice-bound, all her commerce was stopped, and her fleet sealed up. The result was that she was driven southward, to the Bosphorus, to the Persian Gulf, and towards Japan or Korea, where the harbours were not frozen in winter. Any European Power having possession of such a harbour in Korea would be a menace to Japan and Pekin, and would have the command of the Pacific trade to America, and in the China Seas. There was not much promise of trade in the country itself, but it was impossible to say what might be developed if a friendly footing were secured with the Koreans, and commerce and agriculture encouraged. It appeared from what Mr. Carles had said that the people were disposed to trade, so that there was no need to despair of Korea becoming a valuable market for European commerce. He thought they were all very much indebted to Mr. Carles for his valuable paper, and moved a vote of thanks, which was cordially responded to by the meeting.

Excursion in the Abor Hills; from Sadiya on the Upper Assam.

By J. F. Needham, Assistant Political Officer, Sadiya.*

I left Sadiya by boat on the 11th October, 1884, and reached Oling Miri's village at Kodgagora, on the left bank of the Dihong, that evening. My party consisted of Mr. W. B. Mellor, a resident of Sadiya, who volunteered to accompany me, and thirty men, including a guard of frontier police, boatmen, and domestics.

On the 12th we proceeded (by boat) to Bhugdol's village, just below Namsing, on the right bank of the Dihong, and camped there for the night, and on the following morning we started (by boat) for the Membo Abor ghat, about one hour's journey above Namsing, which we reached about 11 A.M. I pitched my camp on the left bank of the Dihong and sent four Bar Abor kotokis (interpreters) to Membo to inform the villagers that I had arrived at their ghat and wished to visit their village, and I told the kotokis that, in the event of the Membo people consenting to receive me, I should want some men to carry up my traps. Next morning (the 13th) two of the kotokis returned in company with Labor, son of Bapok, one of the head men, and eleven other Abors, and informed me that the Membo people wished me very much to visit their village; it was then, however, too late in the day to make a move, so I determined to stay where I was until the following morning, the Membo men remaining in my camp for the night. Late that afternoon Punning, the head man from the Passi Abor village of Balek, called in at my camp on his way to Sadiya, and hearing that I intended visiting certain Passi Abor villages, he told me that his people would be glad to see me, but he requested that I would not visit his village after I had been to Padoo, as cholera had been raging there of late, and I promised him that I would not do so.

About six o'clock on the following morning, leaving one tent and all heavy baggage behind in charge of the Havildar, three frontier police sepoys, and two Abor kotokis, we started for Membo. Our baggage was purposely made very light, comprising only nine loads; but after crossing the Dihong, the Membo men refused for a time to carry most of them, declaring that they were too heavy. They said, "We are sepoys, exactly like your sepoys, not coolies." I told them that I was perfectly aware of the fact, and after explaining that I had made each load as light as I possibly could, and that I was entirely beholden to them for carriage, I gave them a few rupees, and they at last picked them up, and we left the ghat about 7 A.M. After proceeding for about a mile or so, we came upon some of their *arrahs* (cultivated fields), and our path lay through some very fine fields of late *dhan*, intermixed with *anyat* (a plant used for making liquor) and Job's tears. The path through the arrahs is

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wide, and clear of jungle, and after emerging from them we came upon a beautiful gravelly road, cleared of jungle, some 10 or 12 feet in breadth, which took us as far as the Siku (a mountain stream now about 60 feet broad, and running very strong), that is for a distance of about eight or nine miles. On our way to the Siku we met several parties of women and children on their way to the arrahs, and afterwards a hunting party, who were beating the jungles close by, and parallel with our road. The Abors pointed out to us the branch of a tree a long way off, and would not be satisfied until we had fired several shots at it; the Abors then fired a large number of arrows at different objects, and proved themselves to be first-rate marksmen, even at a long distance.

The Siku is crossed by a most ingeniously and strongly made suspension bridge, which is repaired yearly. Two trees about two feet in diameter, one from either side of the river, and of sufficient length to span it, having been felled, and nicely adzed, their bases are firmly fixed (at an angle of about 20 degrees) into pillars of loose boulders, each encased in a very strong bamboo framework, so as to prevent their being washed away, as near the low-water mark of the river as possible, and these trees are again supported, about the middle, by some 150 or 200 stout canes, which reach from the adjacent trees (and there are luckily a good many very fine ones about the place) on one bank to those on the other. For instance, the canes fixed to the trees on the left of the bridge, looking at it from south to north, pass under the centre of it, and are fixed to the trees on the right of the bridge on the opposite bank, and *vice versâ*. After this several canes are stretched across the river a little below, and several a little above the woodwork of the bridge, and a network of cane from one to the other, forms a kind of rail to steady oneself by when crossing over the bridge. I crossed over in company with some twenty other people, and the oscillation was wonderfully slight considering the width, about 120 feet, of the bridge. There is a path from this spot to the south-westward leading to Padoo.

From the Siku up to Membo the distance is about two miles, and I calculated that we ascended about 800 or 1000 feet in that distance. The village site has been marvellously well chosen. On its southern and western sides the hills rise perpendicularly from the bed of the Siku to a height of about 800 feet, and they are quite bare, while to the north and westward the hill-sides are cut up by deep ravines, and they are likewise so perpendicular that it would be impossible to ascend them. As far as I could see the only possible way of getting into the village would be by the path we were taking, viz. from the southward, and there are numerous deep, though narrow, artificially made ravines to be crossed as well as several steep ascents to be made ere the village is reached, each of which might, if necessary, be so defended in turn by a resolute body of men as to make it an exceedingly difficult matter for any enemy to enter the village.

It was past 1 P.M. when we reached the village, owing to the stoppages on the road already alluded to. Had we marched straight through we should have arrived there by about 10.30 or 11 A.M., as I do not think the distance from the ghat is over 12 miles. Just before entering the village we came upon a large number of graves made of bamboos, and thatched. The Abors bury their dead in a squatting posture, and while grieving for a deceased relative they light a fire inside the hut every day. I was met close to the entrance of the village by Bapok, one of the senior *gams*, or head men, who told me that he was glad to see me and that I might stay as long as I liked. He is a thin, wizened old man with rather a nice expression, partially blind, and scarcely able to walk. We were then conducted to a spot close to the village palaver or council-house (called Mosup in Abor), and there we pitched our tent, and while the work was going on, crowds of women, children, and men began to form around us, some taking hold of this, others examining that, and all asking for *aman* (Abor for present). I told them that I was very sorry that I had brought nothing in the shape of presents with me, but this they would not at first credit, and as soon as they did they showed unmistakable signs of dissatisfaction. They said that Dalton, Bivar, and Nabin (?) Sahibs had each brought numerous presents with them when they visited their village, and that they could not understand, therefore, why I had come up empty-handed. I explained that I did not know that it had been usual for Sahibs when visiting their villages to give them presents; that I had come up as light as I could possibly travel; that I was not sure whether they would admit me into their village, &c.: but no amount of even legitimate excuses appeared to satisfy them, for they growled out "Oh! you are a pretty Sahib to come up here in this manner; other Sahibs that came up brought three or four elephant loads of things, and every one got a present." Just then the interpreters suggested a walk through the village, and thinking this was a good way of getting rid of the majority of my persecutors for a time, I jumped at the suggestion, and started off at once to explore the village. It is built on a very broad and stony spur, and the houses lie on terraces, in batches of 60 or 80, one terrace above the other, so that those on the upper terraces are several hundreds of feet above those on the lower. It is a very large village, containing at least from 250 to 300 houses, which, allowing ten people to each house—and I do not think I am over-estimating the number, for I entered several houses, and found families in them numbering from 12 to 20—would give a population of between 2000 and 2500 souls. The ground on which the houses in each terrace are erected, is strewn with loose stones, some of a large size, and is extremely uneven, so that in some places ten or fifteen houses may be seen on tolerably even ground, while around these again the roofs only of others are

perceptible; but every available space has been occupied, for no ground is too uneven to build upon. The houses are all fine, massive buildings (I did not see a single mean-looking house in the village), from 60 to 80 by 20 feet; the front verandah is covered in like the sides, the roof coming to within two feet or so of the front *chang*, and the latter is then carried on, though on a slightly lower level, outside all for some 15 or 20 feet further. This is very convenient in many ways, for on a rainy day there is a large sheltered verandah to sit in; while if sunshine is required, the occupants of each house can squat about on the outer *chang*. No thatching grass is available, and so all the houses are thatched with a kind of plant called *tara* by the Abors, which is very like the *tokopat* used in many parts of Assam, but the lower stem of the tara is excessively thorny. This is split in half, and laid on when dry, and it is alleged that it will last from five to six years. The fronts of the houses are made of huge boards, some of which are three or four feet wide, but they are not, as far as I could see, carved. The heads of all game killed in hunting, as also of those killed at feasts, are arranged on shelves fixed to these boards, and under the roof in the verandah there are numerous bamboo shelves used as receptacles for all sorts of miscellaneous household goods. The eaves of the houses come down close to the ground, and each house has a back, as well as front, exit, but they are nevertheless naturally very dark inside, and as each house has from two to five large fire-places about four feet square, in which fires appear to be kept constantly burning, they are not comfortable places for a stranger, at least, to sit in for any length of time. The fire-places are made (like those in Miri houses) of planks resting on posts covered over with six or eight inches of earth, and over each one there is a bamboo framework suspended from above for drying meat, &c., on. None of the houses have any partitions inside, so that there can be no privacy of any sort. Fowls do not appear to prowl about much inside; they are supplied with bamboo baskets fixed in the front verandah, and they also roost there at night. The pig-styes are at one side of the house. They are partitioned off for each pig, and are boarded, and as the pigs are well fed and cared for, they are fat, and really nice eating; and as the boards upon which they rest are laid down with a slope outwards, most of the filth runs outside, and is carried off by the rain. There are a very large number of jack-trees in the village, the fruit of which is much prized. I also saw some fine lime and orange trees, and I tasted the fruit of both, and found them very good; the majority, however, had recently been hacked down, owing to cholera having been raging at Padoo. These trees are, I am told, thus treated whenever any serious stomachic disease makes its appearance. Why the jack-trees escape upon such occasions, I could not find out. Goitre is very prevalent in the village, and I was repeatedly asked for goitre ointment, though I had none with me. At least two-thirds of the

men, women, and children have it, and some of those I saw were abnormally large, and yet the water appears to be beautifully clean and pure, and the village is plentifully supplied with it from a huge spring which comes out of the rocks at the top of the spur. It is conducted through bamboos to several fixed spots in the village, the distance from the spring to the lower end of the village being at least three-quarters of a mile, or a mile.

We were about two hours and a half walking through the village, and upon our returning to the spot where our tent had been pitched we found some 700 or 800 people, men, women, and children, round it and the spot where our cook was busy getting our food ready, and as soon as we got inside we were completely hemmed in by them. The sides and back were lifted up, and the heads popped in here, there, and everywhere, and everything seized and examined, especially a looking and a magnifying glass which I had with me. About five o'clock we were asked to go and see the *morong* (*mosup* in Abor) or council-house. Abors are proud of their mosup, where all important topics are talked over, and disposed of. I paced the shed and found it 80 yards long and 10 yards wide, with twenty-four fire-places in it. It is built on the same plan as the houses, except that it is entirely open along the whole of one side in addition to having the usual front and back exits, probably to allow of its occupants jumping out speedily in case of an attack, or fire. In this house all the single men warriors reside, and it is also used as a council room.

The side walls are crammed with the heads of every description of animal, and all down the centre of it are to be seen the bows, arrows, fishing gear, hats, spears, &c., of the warriors on bamboo trays. The mosup is close to the entrance to the village, and would hold about 500 men. After sitting there for a short time we returned to our tent and called for dinner. We placed three or four Miris at either entrance to the tent and these men endeavoured to keep back the crowd, but all their endeavours to keep off the people were futile; the pushing and straining for places of vantage, from which a good view of us could be obtained, went on while we were eating, and fingers were unceremoniously popped on to, and into, anything strange, such as corned beef, mustard, pepper, &c. After dinner we went outside, but it was quite as bad there. Our hats were pulled off our heads and went the round of some 100 other heads in as many minutes, handkerchiefs the same. We had to take off our coats that they might feel our chests, and then they insisted on our taking off our boots and socks as they declared we had no feet. The women, I may here remark, are excessively rollicky, and the unmarried girls have apparently any amount of latitude given to them. They are plain, but the majority of them have pleasant, laughing faces. In figure they are squat and heavily made, and big limbed. They wear their hair cropped and have their breasts bare, their only article of clothing being a very short petticoat fastened round

their waist, which reaches to about two inches above the knee. Many of them are tattooed with perpendicular lines over the lips and the corners of their mouths, as also on the back of their legs under the bend of the knee above the calf.

The unmarried girls wear five or six flat circular plates of brass, one slightly overlapping the other, called *boiop*, fixed to a platted band of thin cane under their petticoats, and while working in their fields, or in the village on a hot day, it is the only article they have to cover their nakedness; they also wear little gaiters of platted cane, coloured, about six inches wide, on each ankle, called *essong* in Abor. They are excessively fond of necklaces, earrings, and bracelets, in fact, finery of all sorts. Their teeth are as black as a coal from continually chewing *sali*, tobacco, and *chun* (the latter the Abors make themselves out of a shell which they find in their river beds), and many of them also smoke pipes like the men. They are very fond of singing and dancing; they treated us to two exhibitions, and did their utmost to get us to sing and dance too. There is nothing either graceful or pretty in their dancing. Some fifteen to twenty hold one another by the arm, above the elbow, and after one of their number has sung a line or two, in an almost inaudible, and very plaintive voice, the rest join in a chorus, moving round slowly in a ring the while; sometimes they open out the chain to its full extent, and run up against one another face to face, singing all the while, first one way then the other.

On another occasion they will all move round in a ring with the aid of a small and excessively stiff hop, and bow very low to one another the while. Each village has a *mirü* (Abor word) called Dondai in Assamese, a sort of sorcerer. He is fantastically dressed, wears heaps of necklaces, and bits of cane and other stuffs in his ears, and carries a long knife (called *yoksha* in Abor). He moves about the village in a stately manner and with a dignified air, as if he was quite something out of the common. I have not yet been able to find out what real power these men possess, but as the Abor is naturally very superstitious, I fancy, from the manner he is treated, that he is a great man amongst them. He is supposed to possess preternatural powers and to be able to commune with spirits (*oyu* in Abor). He is consulted in all cases of serious illness, and will then strut about and pretend that he has found out the spirit that is offended, and he will dictate what kind of propitiation is required, but beyond this I know nothing, notwithstanding all my inquiries. The Membo man was brought up to our tent in the evening, and was made to go through a few steps and sing a little for our edification, and while doing so he shook his long knife about and made a jingling noise with it, drawn and pointed upright, but whether he was advocating our immediate slaughter, or soliciting that we should be hospitably and kindly treated, I could not tell, and the interpreters either could not or would not tell us what he said. After dark

he went off and danced and sang with the girls, and we then flattered ourselves that we should get some short respite, but alas, we were mistaken. Everybody goes about the village after dark with a fire-brand made of thinly cut pieces of bamboo, and some dozens of these were brought to our tent and poked into our faces, and presently some wood having been collected, a fire was kindled, and the crowd got thicker than ever, and continued so until 9 P.M., when, as we were tired, we expressed a wish to go to bed. But as fast as we shut the door of our tent it was opened again. Sleep was out of the question. Our sleeplessness was enhanced by two of the kotokis who were lying under the outer fly of our tent calling out to me in Assamese, "Sahib! I don't like the look of affairs. The Abors seem undecided what they intend doing. You brought us up here and we will stick by you, and if you die we will die too." And when I asked what they meant, they merely replied, "How can we say?" Of course all we could do was to put our revolvers under our heads and trust in Providence. Three times were we disturbed by fire-brands being poked into our tent, and when at last we did fall asleep we were awoke by hearing the most awful yells proceeding from every part of the village, and from one man in particular, who, fire-brand in hand, ran yelling past our tent. I immediately woke up the kotokis—for having primed themselves with grog during the day they had by this time fallen off into a sound sleep—and asked them what it all meant; and after listening for a while, they said, "Oh, it is an order from the council-house going round the village telling the villagers that it has been decided that there is to be a general holiday to-morrow, and that every man, woman, and child is to remain in the village and not go out to work." And, as they added that this augured well for us, we were soon sound asleep. At 5 A.M. we were awoke by the cocks crowing and the women pounding out grain, and so we got up and performed our ablutions, and had our early breakfast in peace.

As soon as it was daylight the crowd commenced again to hem us in, and by 6.30 we had some hundreds of new faces around us, chiefly those that had been away from the village on the previous day, and as I noticed one or two men whom I had treated well in Sadiya, we gladly accepted their invitation to visit their houses, and we thus got rid of the crowd for a time. But what with the smoke inside the house we were ushered into, and the liquor we were compelled to swallow at 7 A.M., it was really no better than being pulled about by the crowd outside, and having to answer fifty questions per minute.

We sat there, however, until 8 A.M., after which we visited the chief Bapok, and spent a comparatively quiet hour with him, during which time I managed to ingratiate myself with the old man, by talking to him in the Abor language, and promising to send him a few little odds and ends on my return to Sadiya. During our conversation I hinted that I should like to leave that afternoon, but he would not

hear of it. He said they had a deal to talk to me about in open durbar in their *mosup*, and that it was contrary to Abor rules for the people to assemble there until about midday. While on a visit to my tent, soon afterwards, he told me not to call him Bapok any longer, but "Tato" (grandfather in Abor), and he was very indignant when shortly afterwards I forgetfully spoke of him as Bapok.

A little before 11 A.M. we adjourned to the mosup. I have already mentioned that there are twenty-four fire-places in this place, and as they are nearly always kept alight, I leave you to imagine what a comfortable place it was to sit in, on a warm afternoon, surrounded by some six or seven hundred not over sweet people, all puffing the most filthy tobacco, and drinking a nasty, sickly, sour smelling grog, some of which we were compelled to drink ourselves. We were kept in there until a quarter to four P.M., and during the whole time either Bapok or Pokpang were speaking. Pokpang is an old and very influential *gam*. He is also partially blind, and with the most hideous expression of countenance I ever remember seeing. On the afternoon of our arrival in the village he was pointed out to me, on the occasion of our visit to the mosup, and the Miri kotokis all spoke of him with bated breath, remarking "That man is the most to be feared in Membo. He holds the lives of every man visiting it in his hands."

They touched on numerous subjects, but the chief were as follows:—(1) Our occupation of Nizamghat in 1882, and our prohibiting their crossing the Dibang to seek for new village sites, as also our continuing (they said) to menace them by retaining Bomjur even after their promise not to cross the Dibang. (2) Their being disarmed by the Sissiri guard every time they wish to visit Sadiya. (3) The paucity of the Posa (allowance) money paid to them, and its having been lately still more reduced in order to give Bomjur some. (4) Dums fishing in the Dihong. (5) Our demanding poll tax from Miri residing at Namsing. (6) The fact of the Mishmi having a comfortable rest-house at Sadiya, while they have no place of any sort to go to.

With regard to the first subject they declared that they consulted Lahmon Rai Bahadur in the first instance, and that he actually sanctioned their crossing the Dibang; that their sole reason for wishing to go there was the fact that their village contains so many souls that they are yearly pushed to very great straits to find sufficient space, in proximity to their village, whereon to grow enough crops to feed themselves, and they begged that, as I had now actually seen their position, I would represent their case, and if possible endeavour to get Government to permit them to cross the Dibang and settle at Nizamghat. They declared that if they were allowed to do this they would not in any way interfere with the Mishmi; that they would keep open the road from Nizamghat to Sadiya, and that they would be willing to swear the most solemn oaths, binding themselves to abide by any order we might

choose to give them as to the limit of territory they might claim at Nizamghat. They also pointed out that it was impossible for them to extend their arrahs to the north or west, owing to the Damlah Padams, and Silluk Abors respectively, and that similarly they could not extend them to the southward, owing to Padu, or to the eastward, owing to the Dihong and the neighbouring Mishmi, and that, therefore, they had literally no new lands anywhere to go to.

The Mishmi occupy a good deal of Abor land in and about Silluk and Dambuk, as also a large slice of land between the Dibang and the Sissiri rivers, and they are not molested by the Abors, for the sole reason that the latter fear incurring our displeasure if they did so; why then should not the Membo people be allowed to occupy some vacant land at Nizamghat when they are really in urgent need of land whereon to grow crops to feed their large and ever-increasing population? It is a question which must be settled sooner or later, and I am of opinion that it would be far wiser for us to allow the Abors to do as they wish to do now, viz. allow them to go to Nizamghat, than to allow them to go on increasing to such an extent that some at least must eventually go elsewhere or die of starvation. The Mishmi have never done anything for us beyond bringing in rubber, wax, &c., for the Kyahs, why then should we make enemies of their more powerful neighbours in order to suit their purposes? The Mishmi is lying and cowardly, while the Abor is, for a savage, truthful and courageous. The Abors have always lived in the hills, and hence they are now most averse from living in the plains, and unless the Membo men did this they have not got a single site in the vicinity of their present village to which they could remove and find space for cultivation. If they could do this, is it likely that they would be willing to break up their present homes and go away miles into, to them, an unknown region? Membo has cultivated every inch of available ground from which it can with safety gather the crops which its people grow, and house them when ripe, and unless they can obtain a new hill site to which some of their members may emigrate, they will soon suffer intensely. Their farthest arrahs are now some nine or ten miles from their village; this means, in the busy season, a march of ten miles to their fields, a hard day's work, and a return march of ten miles to their homes. The distance too is so far from home that a party of from thirty to forty warriors have to be told off daily for the protection of the women and children who go to the distant arrahs.

With regard to the erection of a *namghur*, or rest-house, for the Abors, at Sadiya, I said I would write and ask for sanction to erect one for them. It has always struck me as an anomaly that the Mishmi should have one and not the Abors, and I think the sooner we do away with this anomaly the better. The Abors are quite as keen traders as the Mishmi, and they can scarcely be blamed for wishing to protect their rubber trees from

desecration, when they believe them to harbour two of the most powerful spirits (called Apom and Nyipong) they are accustomed periodically to propitiate. We discussed many of their grievances, and as soon as I had finished replying to them, they showed visible signs of satisfaction, and we were permitted to leave the mosup and have a cup of tea; but as soon as this was finished, we were again surrounded by a large mob, who vociferously requested us to fire our guns for the edification of the general community. It was no use arguing that, as there were inhabited houses on all sides of us, there was the danger of a bullet striking a stone, and by so doing maiming, or even killing, some one; so seeing that the men were determined that we should fire, I picked out a large jack-tree some 300 yards from the mosup and fired some dozen or so shots at the branches. After I had finished they brought out their bows and arrows, and showed us what they could do with them, and made us also use them afterwards. We were then permitted to go to our tents and rest.

We were, as usual, up before daylight, and had struck our tent and got everything packed before many Abors were astir, and at 7 A.M., getting our coolies together, we bade farewell to the villagers and commenced our return march. Before leaving the village, however, there was a discussion as to whether we might go through the arrahs or not, as the villagers had determined to have a *gena* that day, but Bapok, the head gam, said we might. When we got to the arrahs, however, our porters at first refused to allow us to go through them, and they threatened to put down our goods and return to the village if we persisted in doing so; but after a long argument, and I had explained that Bapok had told us that we might do so, they consented to our going through alone, while they went round them, through some very dense jungle, making a detour of some four miles more. We accordingly walked down the road through the arrahs, and after passing through them we sat, according to previous arrangement, upon a stone to await the arrival of our luggage, and just as we had seated ourselves, up came one of our Abor friends, with his load, grinning. It appears that previous to our arrival at the arrahs he had lagged behind a little, and so when he came to the spot where his comrades had gone off the road into the jungle, he considered it would be less trouble to come on straight after us, and so he did, although he was acting in strict contravention to all Abor rules by doing so, and shortly after he had arrived up came the four orderlies and our two servants, they having also come by the straight route. The incident shows, I think, that the skirting of fields with crops upon them during *gena* days, is merely an old custom which, when inconvenient, may be broken through without the dread of any very serious consequences ensuing.

On reaching our camp I sent Bhugdol Kotoki, the only Passi Abor

I had with me, off to Romkang to inform the gams and people that I wished to see their village, and we moved to Passighat, reaching there about 5 P.M. I pitched my tents on the right bank of the Dihong, nearly opposite the spot where our troops were encamped in 1859, just before the assault on Romkang. We could see the Padu village smoke curling up above the forest trees, but we could not see the houses. This village is more easily reached from the spot were the Siku empties itself into the Dihong than from Membo. The different shades of green from the Padu fields, on the slopes of the hills, looked very pretty about sunset, and from the centre of them, as it were, rises the sugar-loaf peak called Regam by the Abors. The Padu people declare that it is the abode of a mighty spirit, and none of them therefore ever dream of going up it. It is alleged that there is a bheel or ghost covering about a *poorah* of land, very near the top of it, in which there is a very large Buka fish without tail, and that two black divers swim about the water and guard the fish. The legend was started by the Passi Abors. They declare that years and years ago some of their people, when searching about for a new village site, came upon the bheel and saw the fish and divers in question.

On the morning of the 18th instant we were up early, but Bhugdol Kotoki did not come in with any Abors until about 10.30 A.M. As, however, he informed me that the villagers of Gina, Mongku, Romkang, and Balek (they are all together in a cluster) wished to see me, and he told me that the distance to Gina, where he suggested I should pitch my camp, was only about five miles, I decided to leave at once for the place, and accordingly we started for the village about 11.15 A.M., reaching there about 2 P.M., having halted for three-quarters of an hour, *en route*, at a mountain stream about a mile or so below the village of Gina for breakfast.

The distance from where we left our second tent to the village is between four and a half to five and a half miles. The road lay through dense forest all the way, and unlike the road to Membo, the jungle had not been cleared, so our movements were unavoidably slow. The last half-mile to the village (Gina) is steep, and the ground rugged and stony, and there are also numerous artificially made gullies to be crossed, at present by single planks, ere the village is entered, one and all of which might, if necessary, be speedily strongly palisaded, and as the jungle is very dense in their immediate vicinity the village would be difficult to assault, provided its defenders were brave and resolute men.

At the entrance of the village there is a guard-house to which certain warriors are told off daily, and from this place they keep a look-out day and night. I pitched my camp under a jack-tree on the eastern extremity of the village, and while this was being done we were surrounded, similarly as at Membo, by an admiring crowd. The two gams, Tumkot and Oloong, also came up and said they were glad to

see us, but I noticed several scowling faces among the men, though the women and children were at first exceedingly jovial and friendly. There was the usual cry for *amgn* (present), and there was a very marked display of dissatisfaction upon every one's face when I explained that I had brought none. Upon my explaining, however, as I had done at Membo, that I had only come on a hurried visit this time, being uncertain how I should be received, and promising to bring a few presents next time I came, the majority of the scowling faces disappeared, and our tent was soon as crowded as it had been shortly before at Membo, for people had commenced to come in from the adjacent villages of Monku, Ramkong, and Balek. The women (who are like the Membo women in appearance, dress, &c., except that they have no goitre) were delighted with the looking and magnifying glasses, our boots were pulled off, feet petted and pulled about, coats and hats taken off and tried on, banians opened, and our bodies pinched and examined as at Membo; and when at four o'clock we sat down to a cup of tea the tent was so closely surrounded that one rope was broken and the whole thing threatened to collapse. About this time an incident happened which showed me how very little it required to bring on a row. One of the sulky gentlemen alluded to above had stalked into the tent, which was already almost full to suffocation, and upon my touching him very gently, remonstrating against his pushing his way in in the manner he had done, he rudely pushed my hand away and said, "What do you come here for if you don't want to be looked at? you have brought nothing. Who are you that you can't be looked at? If I want to come in I will. If I want to sit there (pointing to my bed) I will. I shall do as I like." I knew it was no good arguing, so I said in the Abor language, "Certainly, sit down and stay as long as you like. Do just as you like. I did not intend to insult you. You see the crowd in here already: I merely wanted a little room." On another occasion, seeing a little man standing outside, I said to one of the interpreters in Assamese, "Is that man a Miri or an Abor?" But before the interpreter could reply the little man had guessed what had been said, and he became very wroth and said, "You call me a Miri? I am an Abor, I don't belong to you." And he then got very furious with me, although I explained that I had meant no insult; that I was new to the place, and had not called him a Miri, but had merely asked if he was one or not. Nothing, however, seemed to appease him, and after that wherever I went he was at my side scowling. Later on, however, the sulky ones appeared to get better tempered, for I had repeated that I would come and see them all again, and that when I did I would bring them all a small present of something; and I had also conversed a good deal in Abor to the girls and children, as also to many of the men, and this appeared to please them immensely. I had likewise shown the men our guns and revolvers, and had fired many shots into a large jack-tree, first with one

and then with the other. To show their satisfaction they announced their intention to kill a pig, and this was speedily done, and by 7 P.M. every one appeared to be friendly inclined. Their Mirii (sorcerer) was brought up for our inspection, and after dark the girls had a dance, the same in every respect as we had while at Membo.

Early next morning we started to visit Monku, Ramkong, and Balek. These villages have likewise been pitched upon well and carefully chosen sites, the approaches to them are tortuous and narrow, and each could if necessary be easily and stoutly defended by resolute men. I am told that in 1859 we had some very sharp fighting before these villages were stormed and burnt. Monku has about forty houses, and is about one mile from Gina. We stayed there for about half an hour as the people had all been in to see us on the previous day, and then climbed up the hill to Ramkong, which is the largest of the four, having about 100 houses in it. Here we were immediately surrounded, and the chief told us that we should have to remain in the village for three hours as the villagers intended to brew some liquor for us, so we walked about the village, getting a glorious view of the whole valley of the Dihong from the upper portion of it, and chatted with the villagers. About an hour or so after this we were taken off to see the mosup, a fine building, but diminutive compared with the Membo one, and here we found several men busy brewing an enormous quantity of liquor. The brewing was finished about 1.30 P.M., and we then had to swallow some, the interpreters and our three sepoys being made to do the same. After this some huge stones lying in the village were pointed out to us, and one of the gams said, "That is where Dalton Sahib sat and that where Bivar Sahib sat; now you sit there," pointing to two adjacent stones, one for myself and one for my companion, but we were not kept there long. The men told us to return to Gina as they were going there and wished me to be present at a council to be held in the afternoon, and we accordingly departed, marching back through Balek.

Balek is also a small village, containing about thirty houses, approached from Ramkong by a difficult and intricate path. The people had all been down to our camp at Gina on the previous day, and so we were not much persecuted, though we were compelled to fire a dozen or so shots as also to drink more grog, and the usual solicitations for *aman* were made. We stayed in the village for about 20 minutes and then returned to Gina, where as usual we found some 200 or 300 people gathered round our tent and cooking-place. As soon as I arrived I was told that my presence was required at the Cutcherry (nearly all the men of these villages use this word and they know its meaning), and upon arriving there at 2.30 P.M. I found five chiefs from the neighbouring villages, with a large following, awaiting our arrival. The work of speechifying was at once commenced. First one chief spoke, then another, and occasionally an outsider put in a word, and this

continued until past 5 P.M. The chief topics were as follows:—Paucity of *posa* (money allowance) given them; our refusing to return runaway slaves; the Poba stockade looked upon as a menace, and a source of great worry to the whole of the Passi Miyong, the withdrawal of which they requested; Dums being allowed to fish high up the Dihong, and no rest-house at Sadiya for Abors visiting the place. As regards their posa, they declared that the amount was so small that it was useless to them, and they said they would never be satisfied until they got 1000 rupees.

In reply I told them that as they had always received the sum they had now got, I did not think Government would increase it; but that I would represent the matter, and inform them of the result later on.

Their language with regard to the retention by us of their runaway people and slaves, was loud and irate. They argued that inasmuch as they had, years ago, entered into a covenant with us to keep friendly, and to deliver up any of our subjects who might run away from our territory, and seek an asylum with them, we had broken faith with them by not returning their runaways; and when I endeavoured to explain that we should never ask them to return any one who had left us voluntarily and settled with them, unless he was a criminal, they laughed, and evidently considered I was telling a fearful fib. Their language was also vehement with regard to the Poba guard. They commenced the subject by declaring that they had always been our friends, and said that the Poba guard was a menace to them, and that unless it was withdrawn, something would certainly happen, which would, they felt, surely estrange us from one another, a thing they sincerely wished to avoid. I explained why the guard had been placed there, pointed out that it occupied but a very small spot of land, and so forth, and satisfied them at length by assuring them that I would inform Government of their wish, and communicate the result to them later on. With regard to the Dums fishing in the Dihong, as also the erection of a rest-house for them at Sadiya, I told them exactly what I had told the Membo men, and they were quite satisfied.

By 5.15 P.M. having finished replying to their several grievances, the chiefs informed me that they had nothing more to say, and I could see that they, as also the majority of the men, were, like the Membo people, more inclined to be friendly with us after they had poured out their complaints, and been attentively listened and replied to. As soon as we left the Cutcherry a second pig was killed, and I felt that having killed two pigs, and given us a dozen or so of fowls, besides heaps of rice, vegetables, and liquor, they had already been hospitable to us beyond my utmost expectations.

Soon afterwards an incident happened which, had I not been near at the time, might have turned out serious. The sepoys were cooking inside a small enclosure made of green boughs, and there was a goodly

crowd of men, women, and children, watching them. The latter were all laughing and talking amongst themselves, and as they would keep moving very near to the green boughs, one of the sepoys got up and motioned them to go back. This the women and children did, but the men refused to move, whereupon the sepoy commenced abusing them roundly in Hindustani, saying, "You soors, you are not men, only dogs." Luckily I heard this, and rushed up in time to peremptorily order the sepoy to desist. I spoke quietly to the Abors, explaining that the men were not like us, and would not eat if they (the Abors) went near them. I succeeded at last in drawing them away, and as soon as the sepoys had finished their food, I ordered them all to sit down near our cooking-place, where I could see them from my tent, and watched them very closely until they were all asleep. I need, however, scarcely say that there would have been a terrific row had the Abors understood the abuse which the sepoy had levelled at them. I cannot blame the sepoys, for they had behaved exceedingly well, cheerfully enduring the mobbing and pulling about (and they were subject to quite as much of it, if not more than we were), and never either by word or action had shown the slightest sign of surliness or ill-humour, even at meal times, when they were often rudely and unceremoniously interfered with.

At daylight of the 20th inst. we bade good-bye to every one and left the village. By 11 A.M. all our things had come into camp, carried in from Gina entirely by women, and by noon we were on our way to Sadiya, reaching Boivagi Miris village on the Brahmaputra that evening and Sadiya at noon on the following morning, the 22nd inst.

That my trip has been a successful one I think admits of no doubt. I and my party were most heartily welcomed, and hospitably treated by the Passi as well as by the Bar Abors. Colonel Dalton was, I believe, the last British officer that visited Membo, and this was in 1854—thirty years ago. It is no wonder therefore that the people of this village beset us in the manner they did. The last visit to Romkang and other places was by a British force in 1859, when we destroyed it by fire, and yet, here also, we were most hospitably received, and entertained. I cannot speak too highly of the villagers as a whole. We had a quantity of miscellaneous property with us, but notwithstanding that everything was somewhat unceremoniously seized and handled, we never lost a single article, while the gams or headmen of all the villages I visited were not only extremely civil, but went out of their way to make us comfortable.

My being able to express myself in their own language pleased the Abors immensely, and they repeatedly told me so, saying, "Now we are not afraid of the Miri interpreters telling you and us lies;" but although I am convinced that the fact of my being able to do so added in no small measure to the success of my visit to their villages, I never-

theless feel that I have to be thankful to the native interpreters for the part they played throughout. Had they chosen to blacken my fame I feel sure they would have been eagerly listened to, instead of which they invariably spoke of me, and I often (unknown to them) heard them doing so, as a just and kind master, and their having done so helped in no small measure to ensure the Abors treating me well.

GEOGRAPHICAL NOTES.

The late Captain William Gill, R.E.—Miss Gill, the sister of the eminent traveller Captain W. J. Gill, who lost his life, it will be remembered, during the Egyptian campaign of 1882, in the treacherous attack on the party of Professor Palmer in the desert east of Suez, has generously presented the sum of 1000*l.* to our Society for the purpose of founding a "Gill Memorial Fund," the interest to be applied by the Council in an analogous manner to that of the Murchison Grant, in encouragement of geographical exploration.

Mr. Last's Expedition.—Mr. Last reports from Blantyre that he reached that place on January 13th. He stayed a week at Ngomano (the junction of the Lujenda and Rovuma) taking observations to fix its position, and on leaving travelled up the right bank of the Lujenda to its source. The Lujenda valley, he says, rises very gradually, and at the northern end of Lake Amaramba has an altitude of about 1600 feet. Along its whole length it is very fertile and thickly peopled, but the industrious inhabitants are often harried by the robber tribes of Ndondi and Gwangwara, who plunder their plantations and kill or kidnap all who are unable to escape to their places of refuge in the islands, which stud the river throughout its course. Mr. Last travelled along the east shore of Lakes Amaramba, Chiuta, and Kilwa. With regard to the connection or otherwise of Kilwa with the Lujenda, he was invariably informed by the natives whom he questioned that the waters of the lake rise every rainy reason, and then drain, or filter, through the sandy mound which separates the lake basin on the north from the Lujenda. If so, he adds, Kilwa is really the source of the river; but he intends to thoroughly examine the locality on his journey, in the season of high water, to the field of his chief explorations, the Namuli Hills. He was hospitably welcomed at Blantyre by Mr. Hawes, the British Consul.

Recent News from Lake Tanganyika.—Mr. E. C. Hore, now an old resident on Tanganyika, informs us in a letter dated the 18th January last, that he was still engaged in the difficult task of reconstructing the little steamer *Good News*, the portions of which had been conveyed to the lake viâ the Zambesi, Nyassa, and the land-route between the two inland waters. The last load was delivered in

November last, the first having reached him in October 1883. His workshops are fitted up at the missionary settlement on Kawala Island, a healthy spot off the west coast, a little north of the Lukuga outlet. Mr. Hore's second sojourn on Lake Tanganyika has lasted now for nearly five years; his remarks on the level of the lake waters, founded on observations extending over so considerable a period, are therefore of importance. He says, "With the exception of a slight variation of a few inches due to alternate heavy rains and evaporation in the dry seasons, the lake continues at the level secured to it by the waste-pipe Lukuga."

The Portuguese Expedition into Central Africa from Mozambique.—This large and costly expedition,* on the retirement through ill-health of its leader, Major Serpa Pinto, in the course of 1885, made a fresh start for the interior, in the direction of the southern end of Lake Nyassa, under the command of Lieut. Cardozo. It appears to be again in difficulties, for we learn by last mail that the leader arrived with three men only at Blantyre, early in February last, with the object of procuring food and supplies for his party, left destitute several days' march behind, near Makanjila. If he succeeded in replenishing his stores at Blantyre, it was his intention to lead the expedition onward to the Portuguese settlement of Tete on the Zambesi.

Dr. Fischer's Expedition for the Relief of Dr. Junker.†—Dr. Fischer, as we learn from 'Petermann's Mitteilungen,' was at the southern end of Victoria Nyanza in January last, where he had been staying since October 1885. He left Zanzibar about the end of July, and arrived at the lake after a march of 101 days. Of the details of his route from Pangani very little is at present known. It appears, however, that in U-sukuma he was compelled to make a considerable detour, and suffered, like all other travellers in the same region, from the excessive tribute demanded by the petty potentates of the districts through which he passed. His stock of goods has become so much reduced that he will require more money if the expedition is to be carried on. With regard to the unfortunate travellers whom it is his object to reach, Dr. Fischer states that Mr. Mackay, the English missionary in Uganda, had received a letter from Emin Bey, according to which he and Dr. Junker, together with Captain Cassati, were safe with King Kabarega in Unyoro. The date of the letter from Emin Bey to Mackay is not given. It is not known what steps Dr. Fischer will take to reach the travellers, since negotiations with the King of Uganda for permission to cross Victoria Nyanza from Kagehi to Rubaga have fallen through.

* 'Proceedings R.G.S.,' 1884, p. 744; 1885, pp. 44, 119, 337.
† Ibid., 1885, pp. 380, 541.

Progress of Dr. Lenz's Expedition.*—The current number of Petermann's 'Mitteilungen' contains a letter from Dr. Oscar Lenz, addressed to the Geographical Society of Vienna, giving news of the progress of his expedition in search of the missing traveller Dr. Junker and his companions Lupton Bey and Emin Bey. The letter dated 21st December, 1885, from Leopoldville, on the Congo, states that after some delay on the coast he had arrived at Stanley Pool, whence he intended to start about the end of December for the Stanley Falls, having through the kindness of Sir Francis de Winton, obtained a passage for the party on board the steamer *Stanley*. He reckoned that the journey to the falls would be accomplished in about six weeks. Since this date we learn that Dr. Lenz has reached Stanley Falls. He had had several interviews with the great Zanzibar trader Tippo Tib, and is engaged in recruiting porters among the Swahili living in the neighbourhood of the falls. These men, however, appear to be afraid to embark on the journey, in face of the well-known fierce and warlike character of the natives inhabiting the countries to be traversed and also of the uncertain profits they would make from the undertaking. The intention of the traveller is to push forward to Lake Muta Nzige, and thence to the old Egyptian stations on the White Nile. It is feared, however, by competent judges, that the feat will be found impossible, especially with the very limited means which Dr. Lenz has at his disposal.

Mayumba, West Africa.—The 'Missionary Herald' of the Baptist Missionary Society, for March, contains an interesting letter from the Rev. R. Wright Hay, of Victoria, West Africa, giving an account of the physical characteristics of Mayumba, on the Camma coast, north of the Congo. He states that Mayumba is situated in about 3° S. lat., on the seaboard of a vast extent of, for the most part, unexplored country. It is considered by some, even of Stanley's coadjutors, to be the starting-point of the easiest and most direct route to Stanley Pool. A broad lagoon, stretching from the north-east side of the bay in a south-easterly direction for some 80 miles, affords a convenient water-way to the Mamba country, four days' journey through the hilly bush of which brings one to Kungu-land, with its enterprising people working in iron and pottery, and its undulating plains leading to the Pool. The country formed part of the region annexed by the African International Association, which was subsequently ceded to France by the arrangement following on the Berlin Conference. Mr. Stanley's latest map shows Mayumba Bay and Mayumba Point. To the south-east of the point, about two miles inland, is Mayumba Hill, on which is built Mayumba town. The European trading station is situated on a peninsular stretch of beach, so shaped by the course of the lagoon, which, for a considerable distance, lies almost parallel to the coast-line, at a

* *Vide* 'Proceedings R.G.S.,' 1885, pp. 380, 742.

distance of a quarter of a mile from it, before it joins the bay by a circuit round the north-east extremity of this strip of land. This miniature peninsula is of siliceous sand. Upon it are built four trading-houses—two English, one German, and one Portuguese—which serve as depôts for the produce purchased and brought down from the interior. The chief articles of trade are indiarubber and palm-kernels, but ivory is also available and is occasionally shipped. What Mr. Wright was most struck with were the indications of the wealth and variety of the possible trade resources of the country. "While there" (Mayumba), he says, "I saw several blocks of white marble brought from some distance in the interior, and, as calcareous rocks exist largely in the country, it is very probable that quantities of this metamorphosed form of them are to be had merely for the quarrying. In a handful of sand brought from the banks of the lagoon, gold grains were easily discernible; and if these were traced back from the alluvial detritus in which they are found to their original matrix, there is no reason to doubt that, embedded in the quartz hills of Mamba, a seam of the precious metal would be struck. Then, from the forest tracks around, one of the merchants hopes soon to be able to export a very valuable timber."

Journey through Sistan.—M. Merk and Ressaldar Major Bhawuldin Khan have been recently traversing Sistan on their way back to rejoin the Afghan Boundary Commission, after escorting as far as Chahar Burjak on the Helmand the officers of the Mission who were returning to India. M. Merk says he left the Helmand at Bandar Kamal Khan, and then went westwards across a strip of 50 miles of the waterless country which lies between the Helmand and the stream which, under the name of Sarshela, flows in years when the Sistan Hamun is flooded, from the Western Hamun to the God-i-Zireh depression in the northern Beluch desert. His route lay along a wide trough winding from Bandar Kamal Khan, in a general westerly direction towards the Sarshela. The banks of this trough are dotted with numerous ruins of ancient forts, tombs, villages, and pleasure-houses, and in its bed are traces of the great Jui-karshasp canal, which formerly irrigated this now howling wilderness. Last spring the Helmand rose to an unusual height, and much of the flood-water escaped through this trough into the Western Hamun, in fact, reverted to what was not improbably the normal course of the river within historical times. At Trakun M. Merk found a large and important fort in perfect preservation, containing accommodation for 400 or 500 families, the *hammam* in the citadel looking as if it had been abandoned only yesterday, and the large audience-halls showing beautiful ornamentation. According to local tradition the inhabitants left the place about three generations ago. Up to Sarshela M. Merk had been accompanied by Beluchis of the Helmand, who formerly bore the character of notorious assassins and robbers, but who under the strong hand of the Amir, Abdur Rahman

Khan, have been so effectually restrained that one of these Beluchis observed to him with a sigh that now a child might drive a ewe lamb along the frontier and that they alas, must look on! Colonel Sir C. Macgregor's visit to Shah Godar some eight years ago was remembered by these gentry. When M. Merk crossed the Sarshela it was about 100 yards wide, and about two feet deep, running with a good current towards the God-i-Zireh. It was too hazy to see the Kuh-i-Taftan volcano, but the Beluch accounts of it are circumstantial, and according to their belief, it is the undoubted entrance to the bottomless pit. The floods have completely filled the area of the lake marked on our maps as liable to inundation, and the eastern bank was not visible from M. Merk's route. Traffic with Lash Juwain and Persia is carried on by means of reed rafts, and it is anticipated that the waters will not disappear for some years. These lagoons make Sistan fearfully unhealthy in summer, but in winter it is a paradise for sportsmen in quest of wild-fowl. M. Merk's further journey to the quarters of the Boundary Commission was by way of Bandan, Duruh, Awaz, and Yazdan to the Herat valley.

The Tian-Shan.—A Russian expedition is preparing to explore the Kan-Tengri, which are the culminating points of the Tian-Shan range. It will be under the leadership of MM. Ignatief and Krassnoff, the botanist, and will probably start during the summer months.

Mr. H. O. Forbes' Expedition.—According to the latest news (Melbourne *Argus*, March 10th) Mr. Forbes was, at the end of February, still in camp at Sogere, near Port Moresby, busily engaged in making botanical, geological, and ethnological collections. The rainy season was not yet over, and there had been much sickness. Mr. Hennessey, his chief assistant, had returned to Queensland invalided; but Mr. Forbes seemed to withstand the insalubrity of the climate very well. He had conciliated the natives of the surrounding tribes, and little doubt was entertained that he would be able to cross the Owen Stanley range when the rains cease.

Progress in German New Guinea.—The Melbourne *Argus*, March 10th, contains a telegraphic account of a visit paid by Captain Dickson, an old trader in the Pacific, to the German stations on the north coast of New Guinea in January and February last. At Finsch Haven, on a small island in the bay, he found a settlement consisting of six Germans and fourteen Malays, who, for the time, were on bad terms with the Papuans, and had been obliged, for the safety of their lives, to exclude them from the settlement. On the other hand, at Samoa Haven, 250 miles further along the coast to the north-west, where there is a larger settlement comprising 50 Germans, the natives are friendly. This settlement, like that at Finsch Haven, is on an island near the coast. It appears to be perfectly healthy, and the settlers were busily engaged clearing the land,

with a view of founding a township. At present they had no dealings with the natives on the mainland, except by way of trade. The land all along the coast, and the numerous small islands adjacent, are reported to be thickly peopled.

Captain Strahan's Second Expedition to New Guinea.—Captain John Strahan returned in January last from his second expedition* in the interior of the southern portion of New Guinea. He had reascended the Mai Kassa (Baxter) river, for a distance of about 100 miles, besides having made several excursions in the interior of the country, some parts of which he considers eminently suitable for plantation purposes. On the coast, between the mouth of the Mai Kassa and the Gulf of Papua, five smaller rivers were discovered, which proved to be navigable to a certain distance. The collections brought back by Captain Strahan include specimens of wood, products of the soil, some living animals, besides numerous curiosities.

Soundings in the South Pacific.—The U.S. Navy Department has received a letter from Commander A. S. Barker, reporting on a series of deep-sea soundings from Wellington, New Zealand, across the Pacific to the Straits of Magellan, between November 6th and December 16th last. Fifty-seven casts, we learn from 'Science,' were taken during the passage, which extended over a distance of 4500 nautical miles. This line of soundings, running as it does very close to the ice-limit, was chosen by the U.S. Hydrographic Office, with a view to complete for the present the deep-sea survey of the lower South Pacific. In 1875, the *Challenger* made a line of soundings in about 40° S. lat. Between this and Commander Barker's line in the *Enterprise*, the German ship the *Gazelle*, in 1875, also executed a series of soundings. The three series give a fair idea of the general depths in this part of the Pacific. North of the *Challenger's* line, however, over the entire Pacific, lines of soundings should be run in all directions, and at short distances apart; and the U.S. Hydrographic Office has laid out a plan, by means of which this can be done from time to time by U.S. war vessels. The line of soundings of Commander Barker would seem to show that the main bed of the South Pacific commences just south of Chatham Island, the depth increasing very rapidly for the first 300 miles, until 3002 fathoms is reached, in long. 170° W. Beyond this point the profile shows no remarkable irregularities, except in long. 150° W., where there is a depth of 2915 fathoms, with 2650 and 2506 fathoms on each side. From longitude 135° W. the depths decrease quite regularly, until 118° W. is reached, where the least depth, 1562 fathoms, was found. Beyond this the depths increase again quite regularly to the base of the continent. This rise in the ocean-bed would point to the possible existence of a ridge running generally north

* 'Proceedings R.G.S.,' 1884, p. 537.

and south, and limited, as far as is known, by Easter Island, in lat. 27° 09′ S., long. 109° 25′ W., and Dougherty or Keates Island in lat. 59° 21′ S., and long. 119° 07′ W. This ridge is also indicated by a sounding of 1600 fathoms, taken by the *Challenger* in lat. 38° 43′ S., long. 112° 31′ W. The line of soundings taken by the *Challenger* and the *Gazelle* from 100° to 150° W. run generally parallel to that of the *Enterprise*, and show a remarkable uniformity in the depths along the same meridian in the belt of the South Pacific between lat. 40° and 50° S. The surface-temperatures agree with the results of previous observations for the same seasons and latitudes. A section and route chart will be found in 'Science,' March 19th, and full details of each sounding in the U.S. Hydrographic 'Notice to Mariners,' No. 9, 1886.

A New Survey of the United States.—Until the Appropriation Act of 1882–3 the United States Geological Survey was not authorised by law to extend its operations to the eastern part of the States; but in accordance with that Act, the Survey was required to make a geological map of the whole of the United States. In order to accomplish this, it is necessary to prepare a topographical map, and the newly issued 'Fourth Annual Report' of the Geological Survey, states the steps which have been taken in order to accomplish this work. It has been resolved to adopt a horizontal scale of 1 : 250,000, or about 4 miles to an inch, with increase or diminution of this scale if special circumstances should demand it. The vertical relief will be expressed by contours, varying in interval from 200 to 25 feet, according to the nature of the country. It is proposed to publish this general map in atlas sheets, each embracing one degree of longitude by one of latitude, such sheets to be designated by the number of the parallel and of the meridian west of Greenwich, intersecting at the south-east corner of the sheet. In carrying out the enterprise, it has been resolved to take advantage of the results of past surveys as far as these can be depended on; and the Report gives a useful list of such available material. These are the survey of the fortieth parallel under Mr. Clarence King, 87,000 square miles, on a scale of 4 miles to an inch, with contours at intervals of 300 feet; Dr. Hayden's Geological Survey of the Territories, 100,000 square miles, 4 miles to an inch, and contour intervals of 200 feet; Major Powell's Survey of the Rocky Mountain Region, 60,000 square miles, 4 miles to an inch, vertical contours at 250 feet intervals; Captain Wheeler's Geographical Surveys west of the 100th meridian, which embraced several hundred thousand square miles, mostly on a scale too small and by methods too inaccurate to be utilised for the Geological Survey purposes, but an area of 115,000 square miles can be made available. Under the present Geological Survey certain small areas of Northern Arizona and New Mexico have been mapped. Then the admirable work of the Coast and Geodetic Survey along the greater part of the Atlantic, Gulf, and Pacific

coasts will be available. Not only so, but at many parts the Survey has carried its work for considerable distances inland, and the operation of connecting the triangulation of the Atlantic and Pacific Coasts has been commenced at several points. Besides the above, as well as the work of the Lake Survey, of the Engineer Corps, the General Land Office to a considerable extent, and various State surveys, the railway surveys will also be of much value. But with all the available material, it is evident from the map which accompanies the Report, that by far the greater part of the States remains unsurveyed. A great task therefore lies before American geographers, and it is to be hoped that their Government will continue to grant adequate resources for the work until it is completed.

Ascent of Popocatepetl.—Mr. A. S. Packard, the well-known American naturalist, describes an ascent of the volcano of Popocatepetl (Mexico) which he made in company with some friends in March of last year. The height has been variously estimated from 17,716 feet to 18,362 feet. Mr. Packard gives a graphic account of the difficulties of the ascent, and describes the condition of the summit, a description which it may be useful to condense here:—"In comparison with that of Vesuvius or Mount Shasta the crater was, it must be confessed, tame. Descending a few feet to a rock overhanging the chasm now before us, we could take in the entire basin. It seemed to us to be about 500 feet deep and from 1000 to 1500 feet across at the mouth, but according to General Ochoa's measurements in 1856, it is 1000 feet deep and the floor 200 metres in circumference. It is not an irregular chasm like that of Vesuvius, but like a vast cauldron in shape, the steep sides visible all around, and the bottom broad and somewhat flat, with no large deep fissures visible. General Ochoa told Mr. Ober that there are more than sixty solfataras or smoking vents in the crater, one of them over 50 feet in circumference; he called the vents *respiradores*. The northerly rim is of loose volcanic sand, which has been blown up out of the crater. Perhaps two-thirds of the rim was of solid lava more or less jagged and irregular, the highest portion on the south-east side. Looking across from the northerly side one is confronted by three well-marked layers of vertically columnar basalt, marking three successive overflows, while a less regular fourth layer indicated an additional eruption. The rock composing the sides of the crater, the mountain itself, and the sand lying on its flanks is a tough black basalt, slightly porphyritic. Near the rim of the crater on the west side is a sulphur fumarole or respirador, a fissure from which issued clouds of sulphur fumes. At the bottom of the crater were plainly seen two large sulphur vents or solfataras, with smaller ones from which clouds of vapour rose perhaps to a height of over 100 feet, but certainly not half-way up to the edge or top of the peak. Whether these fumes can be seen from below, at the base of the mountain, is a question. The sulphur vents were surrounded with masses of bright

yellow sulphur. It appears that in the time of Cortez a Spaniard descended the crater, tied to a rope, to the depth of from 70 to 80 fathoms or 420 to 480 feet. . . . The summit is of small extent, the edge of the crater is quite free from snow, but a few feet down on the outside from the edge on the north side, the snow begins as a perpendicular wall, three or four feet deep, like a petrified crest of a wave, as if the snow had been melted by the breath of the crater. The following week on visiting Puebla, which lies due east of the mountain, we observed that there was no snow on the eastern and southern sides of the volcano, the snow-fields on the northern side being preserved from melting by their more shaded situation. Without doubt the snow-fields of Iztacihuatl, which extend along the western side of the range, are also thin, and give rise to no extensive glaciers. Some still claim that the mountain smokes, and that the smoke can be seen from below, but this is doubted. Humboldt says: 'Ce volcan, que j'ai mesuré le premier, est constamment enflammé; mais depuis plusieurs siècles on ne voit sortir de son cratère que de la fumée et des cendres.' It is not impossible that the slight amount of sulphurous vapour which is emitted from the crater may at times increase, and be visible at night by moonlight from the plains below, or even in the daytime during certain states of the atmosphere. Whether there has been an eruption of Popocatepetl in historic times is a matter of doubt. It is possible that showers of ashes may have been blown out of the crater, but certainly there is no recent stream of lava or obsidian on the mountain slopes. Humboldt quotes from a letter of Cortez stating that much smoke rose from the crater, and that clouds of ashes enveloped two men who ascended part way up the mountain. From this it would seem that the volcano was rather more active three and a half centuries ago than at present, but it is to be doubted whether there has been an actual eruption of lava within a thousand years. According to various authors there were eruptions in 1519, 1539, and 1540." *

The Gran Chaco.—In the end of 1884 the Argentine Government sent a military expedition into the Gran Chaco for the purpose of putting an end to the raids of the wild Indians. The expedition was accompanied by a staff of scientific men, and the results are given, from official sources, in No. 121 of the *Zeitschrift* of the Berlin Geographical Society. The work of the topographical commission is summarised by Colonel Juan F. Cretz. The mean height of the Chaco above sea-level is found to be 984 feet. The Central Chaco is in general 100 to 130 feet higher than the southern. The Central Chaco is of modern alluvial formation; no rocks were found anywhere. The same conditions are found in the interior of the Southern Chaco, where extensive primeval forests are found, with open spaces of varying extent, covered with the

* The above is abridged from the 'American Naturalist,' February 1886.

most luxuriant grass. Water is reported to be obtainable everywhere, either on the surface or at a small depth below. An exception to this is the region between 27° 21′ and 29° 05′ S. lat., and 62° 04′ and 62° 57 W. long. (Greenwich). This region is sandy and impregnated with saltpetre, and even at a depth of 240 feet no drinkable water was found. Two great rivers cross the Chaco from north-west to south-east—the Bermejo and the Pilcomayo. The first has been explored throughout its whole length, from its confluence with the San Francisco to its mouth in the Paraguay. The Pilcomayo has been explored by the recent expedition from its mouth for 350 miles upwards. From this point to 22° 50′ S. lat. the river is known only from verbal reports, and further northwards to its source, from the explorations of Bolivian expeditions. The Rio Salado in the Central Chaco, between the Bermejo and the Pilcomayo, is apparently an effluent from the vast marshes which the Pilcomayo forms between 22° 30′ and 23° 30′ S. lat. This Salado contains no drinkable water, its banks are marshy, its breadth varies from 125 to 190 feet, and its depth averages six feet; yet on both sides are extensive forests and fine pasture-grounds. The land between the Bermejo, the Salado, and the Parana, is in general high and covered with a luxuriant vegetation, though the want of drinkable water would be a great hindrance to colonisation. The total area explored by the various Commissions of the expedition is estimated at 20,000 square miles, so that, as the geological formation seems to be uniform throughout, we may regard the Chaco as being as well known as the Pampas, and better than Patagonia and the interior of Paraguay. The Central Chaco has an area of 41,780 square miles, and the Southern Chaco of 60,000 square miles. The whole Chaco has thus an area of over 100,000 square miles. The mineralogy, zoology, and botany of the region have been explored by the scientific Commissions, and information obtained concerning a great variety of useful woods. The climate of the Chaco is reported to be in general very healthy. The "chucho" (ague) of Tucuman, Jujuy, and other tropical regions, is stated by the Indians to be entirely unknown. The temperature observations of the Commission gave a mean of 78° Fahr., while the mean temperature of the cold season is reported to be 64°.

The Field of Geography.—Professor Guido Cora has issued in pamphlet form, brought up to date, his inaugural address as Professor of Geography in Turin University, given in November 1883. The subject is the Surface of the Earth as the proper sphere of Geography. Among the subjects discussed are, the relations of geography to the other sciences; geography an individual science; separation of geology from geography; division of geography in reference to its subject-matter and methods; mathematical and physical geography; necessity of teaching geography according to the most exact scientific methods. Professor Cora appeals especially to those English men of science "who

seem still to entertain grave doubts whether geography really possesses a scientific and individual character, and whether it is entitled to be taught even in universities."

Geographical Education.—The Exhibition at Manchester of our Society's collection of appliances used in geographical education has, we understand, been highly successful. The Manchester Society have added a number of objects to the collection, the list of which has been appended to their reprint of the R.G.S. catalogue. The Manchester Society have also issued the Report of their Education Committee, giving the results of their inquiries on the same lines as those contained in the Report of the R.G.S. At present we shall content ourselves with giving the conclusions to which the Manchester Society have come as the result of their inquiry.

"1. That in the primary schools, apparatus of a simple but scientific kind is required. 2. That a better class of maps, relief maps, models, and globes are required. 3. That a perfect text-book should be produced. 4. That it is useless to expect more time can be given to this as a special subject; but that, in connection with history (from which it cannot be divorced), it may, in its historical relations, be fairly dealt with. 5. That in secondary and middle-class schools and colleges more encouragement should be given to the study. 6. That if the subject were specialised at the Universities by lectureships and other means, a body of competent men would in time be produced, capable of dealing with it, whose knowledge and interest in the subject would in time act upon the lower schools. 7. That we want some system of progressive education in this matter which, whatever the text-book, shall be progressive in its operation. 8. That if an examination in this subject and certificates for teachers could be obtained, a great advance in the interest in the subject would be secured. 9. That if a system of prizes could be formed (or the Royal Geographical Society's prizes obtained) by the Geographical Society, and if the University could be arranged with to form a body for examination in conjunction with the Society, and if, lastly, we press the attention of those concerned to the necessity of the science being taken as a whole, mathematical, physical, topographical, historical, and political, we shall have done something to place it in its proper and legitimate position."

It is satisfactory to notice that these are essentially the conclusions which have been come to as the result of the Royal Geographical Society's inquiries.

REPORT OF THE EVENING MEETINGS, SESSION 1885-6.

Tenth Meeting, 12*th April*, 1886.—The Right Hon. Lord Aberdare, Vice-President, in the Chair.

Elections—*Alfred H. Cotton, Esq.; George H. Hawtayne, Esq.; Major Henry George Lefroy; James Rogers, Esq.; Nowell Stanhope Stott, Esq.; Sir Thomas Selby Tancred, Bart.; David Wilson-Barker, Esq.*

The following paper was read, in the absence of the author, by Mr. Gervase Mathew, of H.M.S. *Espiègle*, commanded by Captain Bridge:—

"Cruise in the Western Pacific, including visits to the Caroline and Marshall Islands." By Captain Cyprian A. G. Bridge, R.N.

On the conclusion of the paper, a series of eighteen photographs of the scenery and people of the islands visited, were exhibited on a screen by means of the dioptric lantern and the lime-light.

The paper, with map, will be published in a subsequent number.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—March 5th, 1886: M. Grandidier, of the Institute, in the Chair.—A communication was read from the Minister of Public Instruction announcing that the Congress of the Learned Societies for 1886 would be opened at Sorbonne on April 27th.—The Commercial Geographical Society of Nantes forwarded the programme of the exhibition organised by that Society in connection with the Geographical Congress to be held in the town.—Dr. Hamy gave some information with regard to the School of Interpreters opened at Saigon on 7th April, 1885. The students, who numbered eight Europeans and thirty natives, must be between twenty and thirty years of age. Instruction was given in the Annamite, Chinese, Cambodian, and Siamese languages.—A letter was read from M. l'Abbé Lesserteur, Superior of Foreign Missions in Tongking, offering to the Society a very fine sketch of the river Maa (Thanh-Hoa) along a course of 150 miles, together with the survey of several of its affluents.—The Chairman intimated the presence at the meeting of Colonel Lambert, who, he said, had made a brilliant journey from Futa-Diallon to the sources of the Senegal and Gambia.—The following members of the Bureau were recommended by the Central Commission for election at the General Meeting, April 16th:—President, M. Ferdinand de Lesseps; Vice-Presidents, MM. Victor Duruy, Vice-Admiral Paris, MM. Edmond Cotteau, and Hugues Krafft; Secretary, M. Ch. Rabot. The quinquennial election of the members of the Central Commission would also take place at the same date.—M. A. Martel read a short paper on the district of the Causses, which he said was so little known.—In conclusion, Captain Monteil, of the Marine Infantry, made a communication with reference to Senegal and the French Soudan; the latter country he regarded as suitable for colonisation.

——— 19th March, 1886: M. Grandidier, of the Institute, in the Chair.—M. Édouard Gibert, a member of the Society, made some observations with reference to the country of the Causses, which had been described by M. Martel at the previous meeting.—M. Michel Venukoff communicated the following information:—M. Prejevalsky had been promoted to the rank of general, and had been granted a pension of 240*l.* a year for life. He was engaged in writing an account of his recent journey. According to the latest news (August 1885), MM. Bunge and Toll had explored the valley of the Lower Yana and were on the point of starting for the island of Katelny. M. Mushketoff had just published the first volume of his work on the geology of Turkistan, which contained among other things a good geological description of the Aralo-Caspian steppes.—M. R. du Caillaud furnished some information with reference to the recent discovery of petroleum wells in Egypt near the Zeiti Mountains. Three notes from the same author were also read: (1) on the first ambassador to China, (2) on the establishment of a French Catholic mission at Lakhon, (3) on the Tongking Chinese frontier.—A letter was read from Dr. M. Lindmann on the question of the maps carved on wood which were discovered among the natives of the east coast of Greenland. He was of opinion that they were the work of German and Dutch whalers of the seventeenth and eighteenth centuries who had been wrecked on the shores of Greenland.—M. Dutreuil du Rhins

presented on behalf of the publisher, M. Challamel, a new map of Western Africa, prepared by Commander Koch, one of the members of the Society; the map, he said, contained all the latest information obtained by M. de Brazza and also by the members of the International African Association.—M. Maunoir laid on the table a map of Afghanistan also executed by Commander Koch.—A communication was read from Léon Teisserenc de Bort on the ruins of the ancient town of Nefzaua, visited by him during his last journey in Tunis.—In conclusion, M. Henri Duveyrier gave a short account of the journey accomplished by him last year from Tangiers to Fez and Meknâs, in company with a French embassy under the direction of M. Charles Féraud, French Minister at Tangiers. This communication will be published in the Quarterly Bulletin of the Society.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Arnold, Thomas.—The Second Punic War, being chapters of the History of Rome. Edited by William T. Arnold, M.A. London, Macmillan & Co., 1886: post 8vo., pp. xxvi. and 435. Price 8*s.* 6*d.*

Mr. W. T. Arnold has published in a separate form the portion of Dr. Arnold's 'History of Rome' relating to the Second Punic War, with careful and thorough geographical and topographical notes. The Alpine Pass of Hannibal is once more discussed by the light of the newest contributions to this ancient controversy. Mr. Arnold expresses himself strongly in favour of one of the Durance Passes as against the Mont Cenis or the Petit St. Bernard, and, on the whole, inclines to the Col d'Argentière, a route the claims of which Mr. Freshfield has argued at length in the 'Alpine Journal,' Nos. 81, 93. Mr. Arnold has added greatly to the value of his father's classical work by his geographical researches, which are a fine example of the application of geography to history. Eminent historians have been known to trust to their Baedeker as a guide to places of historical interest in Italy. Mr. Arnold's publishers have obviated the necessity of an appeal to Baedeker by introducing some very excellent German maps (very Baedeker-like in their aspect), railways and all, to illustrate the marches of Hannibal some 2000 odd years ago. The young student who uses this edition of Dr. Arnold's work will be interested, if not puzzled, to discover that railways in N. Italy and S. France are of such antiquity. Mr. Arnold, we should say, has prepared a useful list of the modern "literature" of the subject from 1842 to the present time.

Bayberger, Franz.—Geographisch-geologische Studien aus dem Böhmerwalde. Die Spuren alter Gletscher, die Seen und Thäler des Böhmerwaldes. Ergänzungsheft No. 81 zu 'Petermann's Mitteilungen.' Gotha, Justus Perthes, 1886: pp. 63.

This is a valuable study on the Bohemian forest, the result of careful investigation on the spot. The traces of former glaciation in the region are studied in various aspects, followed by sections on the lakes and on some of the valleys. There is a map showing the glacial traces (scale 1:600,000), and a series of profiles of the lakes.

[Black Sea.]—Das Schwarze Meer. Von J. Luksch und J. Wolf. 'Deutsche Rundschau für Geographie und Statistik,' 6 and 7 Hefte, 1886.

These are the first two instalments of a very full monograph on the Black Sea, which will be completed in another number. The first instalment is accompanied by a map of the Black Sea and neighbouring regions, by G. Freytag.

Ross, Mars, and Stonehewer-Cooper, H.—The Highlands of Cantabria, or Three Days from England. London, Sampson Low & Co., 1885: 8vo., pp. xvi. and 378. Price 21s.

The authors of this attractive volume have discovered a new tourist ground in the highlands that border the Spanish coast of the Bay of Biscay, and to which the ordinary guide-books scarcely allude. To judge from the very interesting account of their own tour and the many beautiful illustrations that adorn the book, the scenery is of the most varied and attractive character, while both the sportsman and the salmon-fisher will find plenty of occupation. Incidentally there is a good deal of information on the geography and topography of the region, which is of great historical interest. The small map is very inadequate.

ASIA.

Cochinchine Française.—Excursions et Reconnaissances. Nos. 24 and 25. Saigon, 1885–6.

In the former of these numbers of this very valuable serial, M. Aymonier begins a series of 'Notes on Annam,' with a detailed study of the province of Binh-Thuan; while M. Brien has a paper extending over the two numbers on the Siamese province of Battambong, which he states was taken from Cambodia in the end of the 18th century. M. Landes gives, in No. 25, a fifth article on Annamite stories and legends.

Doughty, Charles M.—Travels in Northern Arabia in 1876 and 1877. Cambridge, the University Press, 1886: vol. i., 8vo., pp. 619.

In vol. vi. (1884) of the Proc. R.G.S., will be found a summary of the very valuable work done in Arabia by Mr. Doughty, during his wanderings in 1876–8. The work, of which this is the first volume, may be regarded as the detailed expansion of that paper, and will be welcome not only to those interested in the geography of Arabia, but even more probably to students of its many remains of the past. But indeed the book abounds in the most varied interest. Mr. Doughty became intimately acquainted with the people among whom he sojourned, lived their lives, heard their legends, was admitted into their households, and in many ways had unusual opportunities of studying the Arab at home. The story of his sojourn and discoveries reads like a new volume of Hakluyt, permeated with an Eastern flavour that will remind the reader of the earlier Bible narratives. Anachronistic as the style is, it is at the same time so spontaneous, that the general effect is rather pleasing than otherwise. Mr. Doughty's journeys extended over the area comprised within 22° and 29° N. and 37° and 44° W., not reckoning those in the country to the east of the Dead Sea. At the start Mr. Doughty joined a Haj or pilgrim band and accompanied them as far south as Medyin Salih. Here he remained for ten weeks till the return of the Haj, during which time he had ample opportunity of studying the country and its antiquities, which, and especially the inscriptions, he describes in great detail and with many illustrations. After the departure homeward of the Haj, Mr. Doughty devoted himself to a leisurely and thorough study of the country and the people in all their phases and aspects. Not the least important of the results thus obtained are those relating to the very remarkable geology of the country, which he thus quaintly summarises on the map attached to this work: "The constitution of the Arabian Peninsula appears to be a central stack of Plutonic rocks, which are granites with traps and old basalts, whereupon are laid sandstones (continuous with those of Petra and probably 'cretaceous'), and limestones (sometimes with flints) overlie the sandstones. Newer rocks are the volcanic, with craters, and namely of the vast Harras; the Flint Land of gravel (upon limestone with flint veins), that is Arabia Petræa, in which were found flint instruments (as those of Abbeville) by Mr. Doughty at Maan, 1875; and ancient flood soil, block drift, loams, or clays in the valleys and low grounds. The Nefuds are accounted with the sandstones." Specialists may no doubt differ from Mr. Doughty in some of his conclusions, but the value of the varied information he

has collected, and the curious interest of his narrative, will be admitted. The map is on the scale of 32 English miles to an inch.

Emanuel, Louis.—Jottings and Recollections of a Bengal "Qui Hye!" London, James Blackwood & Co. [1885]: cr. 8vo., illustrations, pp. 227. [Presented by the Author.]

[India.]—Report on the Administration of the Meteorological Department of the Government of India in 1884–85. Folio, pp. 102.

Moore, Joseph, Jr.—The Queen's Empire; or, Ind and her Pearl. Philadelphia and London, J. B. Lippincott and Co., 1886: 8vo., map and plates, pp. 280. Price 14*s*. [Presented by the Author.]

The results of the author's previous experiences in the East were embodied in his 'Outlying Europe and the Nearer Orient,' published in 1880. The present volume treats more particularly of travel in India and Ceylon. On leaving Venice, Mr. Moore and a companion travelled by way of the overland route to Kurrachee and Bombay, whence he visited Surat, Jeypore, Delhi, Lahore, Umritsur, Agra, Cawnpore, Lucknow, Allahabad, Benares, and Calcutta. After making a trip to Darjeeling, the author returned to Calcutta, and embarked for Madras, afterwards visiting Ceylon. The volume is illustrated with fifty phototypes representing cities, public buildings, &c.

Mushkétof, J. V.—Turkestan. Geologicheskoye i orographicheskoye opisaniye po dannym sobrannym vo vremia puteshestvii s 1874 po 1880. (Turkestan. A Geological and Orographical Description, from materials collected during travels undertaken in the years 1874 to 1880.) Vol. i. St. Petersburg, 1886: pp. 741, 42 woodcuts, 4 plates, and a geological map.

M. Mushkétof, already well known as a geologist and traveller, after devoting six years to a practical study of his subject, has now brought out the first volume of his great work on Turkistan.* This is divided into two parts; the first treating of the history of research in Central Asia from the earliest times to the present, the second dealing with its geology.

In the first are reviewed at greater or less length all the travels in Turkistan, beginning with those of the Buddhist missionaries in the early ages down to those of the latest Russian explorations. Special attention is given to geological investigations by the author's predecessors in this field. In this way the works of Semeonof, Sévertsef, Romanofsky, Richthofen, are examined critically, their systems of orography compared with those of Humboldt and the earlier geographers, and some of their theories disputed. Of the more recent expeditions Mushkétof is able to communicate new particulars from hitherto unpublished reports, such as Ivanof's MS. notes of a journey to the Talas Alatau Mountains, where he found a number of glaciers. To the numerous works on travel, Russian and English, reviewed in this volume, Mushkétof adds a notice on the labours of Reclus and Richthofen, to the latter of whom he gives the preference, for his admirable method in defining his subject, for his orderly treatment of authorities and able criticisms, merits which entitle him to rank as an historical geographer next to Ritter.

In the second part of Mushkétof's work the results of his own investigations are given. In the first chapter (Chap. 9 of the book), the author takes us from Orenburg to Samarkand, sketching the geological features by the way. He has a good deal to say about the Kara-kum sands, partly confirmatory of what has already appeared in print; of the loess formation which he saw well

* His earlier publications containing the chief results of his investigations appeared in various scientific periodicals, and his journey to the Zarafshan glacier was translated and read at one of the Evening Meetings of the R.G.S. See Supplementary Papers, vol. i. p. 246.

developed in the valley of the Syr-daria near the town of Turkistan and on the structure of the mountain ranges belonging to the Tian Shan system, which first opens to view at Butuni as a splendid panorama. We are also told of the mineral wealth in the Kuraminsk mountains, with their veins of silver, lead, beryls, porphyries, diabas, and other minerals. Chapter 10 is devoted to Samarkand, a city as interesting to the geologist as to the historian and archæologist. Here there are a number of caves in the loess rock presenting similar features to those in the Bamian cliffs, but the chief interest centres in the ruined buildings and the materials of which they were constructed. The marble or limestone blocks giving solidity to the edifices, have resisted the wear of six centuries, and prove that the architects of the fourteenth century were very different to those of the present day, who can only build mud houses. Chapters 11 and 12 are occupied with the western spurs of the Tian Shan, chapter 13 with the valley of Ferghana, chapter 14 with the western Pamir-Alai, chapters 15 and 16 with the valley of the Amu-daria, chapters 17 and 18 with the Kizil-kum sands, and chapter 19 concludes the volume.—**[E. D. M.]**

[Palestine].—The Survey of Western Palestine. Memoir on the Physical Geology and Geography of Arabia Petræa, Palestine, and Adjoining Districts, with special reference to the mode of formation of the Jordan-Arabah Depression, and the Dead Sea. By Edward Hull, LL.D., F.R.S., Director of the Geological Survey of Ireland and Professor of Geology in the Royal College of Science, Dublin. Published for the Committee of the Palestine Exploration Fund, 1886: 4to., pp. viii. and 145.

Professor Hull went out to Palestine in 1883–4 on behalf of the Executive Committee of the Palestine Exploration Fund, to make observations along a tract of country extending from the Gulf of Akabah to the Jordan and banks of the Dead Sea, in order to explain the formation of Western Palestine, and of the great line of depression, which extends from the base of the Lebanon on the north to the Gulf of Akabah on the south. In Egypt, Professor Hull and his party were joined by Major Kitchener; they struck thence into the desert of Mount Sinai as far as the head of the Gulf of Akabah; thence along the whole length of the Wady el Arabah to the southern shore of the Dead Sea, and thence along the western shore as far as Engedi, into the table-land of Judea by Hebron, and so on to Jerusalem. An intended excursion into Northern Palestine had to be abandoned on account of the snow. Professor Hull gives a valuable list of previous writers on the geology of Palestine, and then proceeds to describe systematically in detail the results of his own observations, which must be regarded as an important addition to previous knowledge, though some of his conclusions and theories are likely to be disputed by geologists. The first part of the work, pp. 3–27, is devoted to the physical geography of the interesting region, which he considers under the following five districts, each contrasting strongly with those adjoining, and indicates differences in the geological structure. 1. The Maritime district, stretching from the base of Carmel southwards by Ramleh, Gaza, and the desert of Beersheba, to the Isthmus of Suez and into the plains of Lower Egypt. 2. The Table-land of Western Palestine and the desert of Tîh. 3. The Depression of the Jordan Valley and of the Ghor, continued southwards through the Valley of the Arabah into the Gulf of Akabah, attaining its maximum superficial depth below the level of the Mediterranean, of 1292 feet, at the margin of the Salt Sea. 4. The elevated plateau of the Jaulan, and the table-land of Moab and Edom. 5. The mountainous tract of the peninsula of Sinai, lying between the Gulfs of Suez and Akabah. In the remainder of the work the geology of the region is described in detail. In the chapter on Dynamical Geology, Professor Hull coincides with most of his predecessors in the opinion that the Jordan-Arabah is the result of a fault. In concluding chapters he discusses the origin of the saltness of the Dead Sea, and recent changes of climate and their causes. There are geological maps of Lower Egypt, Arabia Petræa, and Palestine; position of land and sea during the "pluvial" period; the Wady el Arabah sections across Sinai and Palestine. There are 19 woodcuts in the text.

Riedel, J. G. F.—De Topantunuasu of oorspronkelijke Volkstammen van Centraal Selebes. In 'Bijdragen tot de Taal- Land- en Volkenkunde van Nederlandsch-Indië,' 5de Volgreeks, 1ste Deel, 1ste Aflevering. 1886: pp. 77–95.

This is an original contribution to a knowledge of the various aboriginal peoples in Central Celebes under the collective name of Topantunuasu; it is accompanied by a map.

Vereschagin [Herrn und Frau].—Reiseskizzen aus Indien. II. Bändchen: Kaschmir, Ladak. Leipzig, B. S. Teubner, 1885: 12mo., illustrations, pp. 120. Price 2*s.* 6*d.*

AFRICA.

[Africa.]—Mittheilungen der Afrikanischen Gesellschaft in Deutschland. Band v., Heft i. Berlin, Reimer, 1886.

In this part Dr. Büttner describes his journey in July–September last, from Kisalu eastwards across the Quango, southwards to Muene Putu, and then northwards by the left bank of the Quango to Stanley Pool. This is accompanied by a map constructed from the journal of Dr. Büttner by R. Kiepert (1:750,000), and a list of altitudes calculated by Herr Danckelman. Most of the number, however, is occupied with communications from Herrn Flegel, Semon, and Gürich, on the Niger expedition under the former, in the summer and autumn of last year. The notes of the travellers, both on the Niger and Benue, their topography, people, and biology, are a useful addition to existing knowledge.

Crozals, J. de.—Le Commerce du Sel du Sahara au Soudan. In 'Revue de Géographie,' April 1886. Paris, Delagrave.

This is the first instalment of a paper on the subject.

[Egypt.]—Bulletin de la Société Khédiviale de Géographie. IIe Série, Numéro 8. Le Caire, 1886.

The principal paper in this number is Colonel Purdy's account of his reconnaissance with a view to the construction of a railway between Berenicé on the Red Sea and Berber. No date is given for the expedition. There is a route map on the scale of 1:500,000. There is also a short paper by M. Mosconas on the Hadendowas, and the traces which exist among them of the manners and language of ancient Egypt.

[Obock.]—La Colonie D'Obock, Le Tadjourah et les Territoires Voisins jusqu'à Gubbet-Karab. By M. De Lanessan. In 'Annales de l'Extrême Orient,' March 1886, pp. 257–271.

This is the first instalment of a detailed memoir on Obock and the neighbouring region.

Reichard, Paul.—Bericht über seine Reisen in Ost-Afrika und dem Quellgebiet des Kongo. 'Verhandlungen der Gesell. für Erdkunde zu Berlin,' No. 2, 1886, pp. 107–125.

A detailed account by Herr Reichard of his important journey from Mpala on the Tanganyika to the Luapula, Lualaba, and Lufira, on which a few notes appeared in the Proc. R.G.S., vol. vii. 1885.

Stutfield, Hugh E. M.—El Maghreb: 1200 miles' ride through Marocco. London, Sampson Low & Co., 1886: cr. 8vo., map, pp. xi. and 347. Price 8*s.* 6*d.* [Presented by the Publishers.]

The author's visits to Marocco were made in each of the years 1882–1885, the journey of 1883 forming the principal subject of this volume. On leaving Tangier the author proceeded by way of Alcazar and Wazan to Fez, afterwards striking westwards to Mequinez, from which place he journeyed by way of Sidi Kassim to Rabat. Continuing his journey, Mr. Stutfield arrived at Casablanca,

where he struck inland for Marocco by a road never described by any previous travellers. The route lay through the provinces of Shaouia, Temsna and Seraghna. On leaving Marocco the author travelled westwards to Mogador, and returned to Tangier by way of Saffi, Azamoor, Casablanca, Rabat, and Larache.

The map, on a scale of about 63 miles to an inch, shows the author's route and the ethnology of Marocco.

AMERICA.

[Brazil and Bolivia.]—Commissão de Estudos da Estrada de Ferro do Madeira e Mamore. Relatorio apresentado a S. Ex. O Sr. Conselheiro João Ferreira de Moura, Ministro e Secretario de Estado dos Negocios da Agricultura, Commercio e Obras Publicas. Pelo Engenheiro Chefe Julio Pinkas. Rio de Janeiro, Imprensa Nacional, 1885, 4to., pp. xx., 243, and 111. Plates and maps. [Presented by the author.]

Under the patronage of the Bolivian Government, several surveys were made a few years ago, with a view to improve the navigation of the Madeira, and establish a land communication between its lower waters and the Mamoré, the upper course of the river; the object, of course, being to establish a practicable trade-route between Bolivia and the Amazon. From various causes, no definite practical results have resulted from these investigations, though they added much to our knowledge of the geography of the region surveyed. Hitherto the Brazilian Government took no active part in these surveys, though much of the ground gone over falls within Brazilian territory. At last, however, it has resolved to take the matter in hand, and in 1883 a surveying expedition was sent out under the leadership of the engineer-in-chief, Julio Pinkas. The object of the expedition was mainly to survey the great bend between the lower and upper river, with a view to the construction of a railway. The result was so favourable that the report concludes by a definite proposal for carrying out the scheme. The expedition consisted of a considerable staff of very competent men, and as their programme included observations on the geography of the region in all its aspects, hydrography, ethnology, climate, sanitary conditions, character of soil, vegetation, &c., Senhor Pinkas' Report is of considerable scientific as well as engineering value. One most useful and attractive feature are the many very excellent photographs of the scenery in the Madeira-Mamoré region, giving one a very satisfactory idea of the various aspects of the country. The maps are—General sketch-map of the proposed route (1 : 200,000); profile of the same (horizontal scale, 1 : 200,000; vertical scale, 1 : 2000); map showing the present and future communications of Bolivia with Europe (1 : 5,000,000); sketch-map of Keller's survey (1 : 800,000).

[Chile.]—Sinopsis Estadistica y Geografica de Chile in 1885. Officina Central de Estadistica. Santiago de Chile, Imprenta Nacional, Moneda, 112. 1886, 8vo., pp. 49.

This is an exceedingly useful annual, containing much well-arranged information on the geography and statistics of Chile. Under Geography we have a succinct statement of the boundaries, configuration and aspect, superficies, climate, physical division, political division. This is followed by an historical *résumé*, a section on government and administration, sections giving statistics and other information on the various Government departments, including trade, industry, and shipping. Including the two Peruvian provinces of Tacna and Arica, at present under the administration of Chile, the territory of the latter now extends from 17° 51′ S. lat. to 55° 59′ S. lat. The *Sinopsis* divides Chile physically into the following zones:—(1) Mineral zone, between 18° and 27° S.; (2) Mineral and agricultural zone, between 27° and 33°; (3) Agricultural zone, between 33° and 43° 30′; (4) Forest and fishery zone, from 43° 30′ to 56°. The total population on January 1, 1885, including the Peruvian provinces, is estimated at 2,439,537, and the area 289,560 square miles. The decennial census was taken on November 26, 1885, too late to permit of the results being embodied in the *Sinopsis*.

Ehrenreich [Dr.].—Land und Leute am Rio Doce (Brazilien). 'Verhandlungen der Gesell. für Erdkunde zu Berlin,' No. 2, 1886, pp. 94–107.

A very full account of the region watered by the Rio Doce, provinces of Espiritu Santo and Minas Geraes, its peoples and industries.

Horsford, Eben Norton. — John Cabot's Landfall in 1497, and the Site of Norumbega. A Letter to Chief-Justice Daly, President of the American Geographical Society. Cambridge (U.S.), Wilson & Son, 1886: 4to., pp. 41.

Mr. Horsford deserves credit for the great industry he has displayed in working out the problem which he set before him. His reasoning may possibly not carry conviction to many, but the valuable array of facts he has brought together will certainly be of real service to students of early American exploration. The conclusions to which Mr. Horsford comes he states thus:—"1st. That the Site of the Landfall of John Cabot in 1497 has been determined to be Salem Neck, in 42° 32′ N. lat., the Norum (the neck, to one standing on it) of the Norumbega of Cabot, and Nahum of the Nahumbeak of Ogilby and Smith. The first land *seen* may have been Cape Ann, or possibly the mountain Agamenticus. 2nd. That the town of Norumbegue, on the river Norumbegue, of Allefonsce, the Norumbega visited by Ingram, and the fort of Norumbegue and the village of Agoncy of Thevet, were on the Charles river, between Riverside and Waltham, at the mouth of Stony Brook, in latitude 42° 21′ N. (Middlesex County, Mass.). 3rd. That John Cabot preceded Columbus in the discovery of America." Mr. Horsford's Memoir is very handsomely got up, with numerous photographs of sites and reproductions of old maps.

Martin, K.—Bericht über eine Reise ins Gebiet des oberen Surinam. In 'Bijdragen tot de Taal- Land- en Volkenkunde van Nederlandsch-Indië,' 5de Volgreeks, 1ste Deel, 1ste Aflevering. 1886: pp. 1–75.

Polakowsky, H.—Zur Geschichte der Entdeckung und Eroberung von Chile. I. Von der Entdeckung der Magellans-Strasse bis zum Tode des Pedro de Valdivia (1520–1554). 'Zeitschrift der Gesellschaft für Erdkunde zu Berlin,' 21ster Band, 1es Heft, pp. 1–58.

ARCTIC.

Danenhower, [Lieut.] John W.—The Polar Question. From the 'Proceedings' of the United States Naval Institute, August 15, 1885. 8vo., pp. 53, with Circumpolar map.

This is a paper which was read at the U.S. Naval Institute, Annapolis, October 9, 1885. Lieut. Danenhower presents a brief review of what is known of the Arctic regions; discusses the various routes to the North Pole; the subjects of polar ice and Arctic tides and currents; and concludes by attempting to show that in no department of knowledge would the gain to be obtained by further expeditions be worth the risks and the outlay; at least, so long as so much remains to be done in other and more accessible parts of the globe. In these conclusions, we believe, Lieut. Danenhower will not be supported either by the best Arctic authorities, or by the most competent scientific specialists.

GENERAL.

[French Colonies.]—Notices Coloniales publiées à l'Occasion de l'Exposition Universelle d'Anvers en 1885. Paris, Imprimérie Nationale, 1885. Three vols., 8vo., vol. i. pp. x. and 664; vol. ii. pp. ii. and 745; vol. iii. pp. viii. and 768. [Presented by the French Ministry of Marine and the Colonies.]

——— Atlas Colonial. Par Henri Mager. Paris, Bayle [1885]. Price 16*s*.

The former of these works is one of great value and authority, containing as it does detailed official information concerning all the foreign possessions belonging to France. The notice of each colony includes its physical geography, climatology, natural history, political and administrative divisions, ways of communi-

cation, population, commerce and manufactures, industry, immigration, finance, public works, and other points of economical interest. The information under each head is very full, especially in commercial and industrial matters. Algeria and Tunis are not included in these volumes, which, on the other hand, give Kerguelen as a French possession, and seriously advocate its colonisation. Very excellent maps are given of all the colonies, besides two general maps—one showing the telegraphic connections with the mother country, and the other indicating the colonies of France in the years 1661, 1683, 1815, and 1883.

The Atlas Colonial (which is not an atlas in the English sense, but text accompanied by maps) is to a large extent based on the work just referred to, though each colony is edited by a specialist, and there is a preface by M. Paul Bert on "The Colonising Spirit." The editor has not hesitated to include the New Hebrides and Solomon Islands in his volume, though on a tiny separate slip he admits they do not belong to France. There is a separate chapter on the commercial relations of the French colonies, including sections on the expansion of the colonial marine and on the defence of the colonies. The maps are the same as those in the official work.

Froude, James Anthony.—Oceana, or England and Her Colonies. London, Longmans & Co., 1886: 8vo., pp. xii. and 396. Price 18s.

Mr. Froude's remarkably racy and instructive volume can hardly be regarded as a contribution to the geography of our colonies. It is one, however, which must be studied by all who desire to form an adequate conception of the development of our colonial possessions so far as that is dependent, among other influences, on geographical conditions. Mr. Froude has fixed and definite opinions on colonial as on other matters, and those interested in the nature of the connection which should subsist between the mother country and the colonies, will find in his interesting narrative much that will prove suggestive. The colonies visited by Mr. Froude were the Cape, South Australia, Victoria, New South Wales, New Zealand, and home by the Pacific and the United States.

Jordan, William Leighton.—The Ocean: a Treatise on Ocean Currents and Tides, and their Causes, demonstrating the System of the World. Second edition. London, Longmans and Co., 1885: 8vo., plates, pp. xvi. and 281. Price 21s. [Presented by the author.]

Petermann's Mitteilungen aus Justus Perthes' Geographischen Anstalt. Herausgegeben von Prof. Dr. A. Supan. 32. Band, 1886, III. Gotha, Justus Perthes.

To this number A. Phillipson contributes an able paper on the theory of erosion by water, in which he endeavours to formulate what is the result of the erosive action of a body of water at the several points of its course. Dr. Rink concludes his review of recent Danish researches in Greenland. From Dr. Woeikoff there is a table giving the leading results in distance and altitudes of the recent survey of Siberia. Dr. Paulitschke gives the results of Major Heath's and Lieut. Peyton's journey last year from Harar to Berbera, with a route-map by himself on the scale of 1 : 750,000.

——— IV. Gotha, Justus Perthes.

The leading papers in this number are the following:—Travels in the region of Muschi-Congo, in Portuguese West Africa, by Dr. Joseph Chavanne, with map (1 : 400,000).—The Hydrographical Appendage (*Zubehör*) of the Muta Nsige, by Prof. A. Kirchhoff. In this paper Prof. Kirchhoff briefly sums up all we know of the Muta Nzige, with a view to decide whether it belongs to the Congo or the Nile system. As might be expected he shows that the evidence points strongly to the latter conclusion, but hopes that what he considers one of the most important of African problems will soon be solved on the spot.—Dr. Karl Lechner describes what he calls a Tyrolese-Bavarian linguistic island (*Sprachinsel*) in Moravia. Dr. Lenz sends a short letter from Leopoldville, Dec. 21, 1885, describing the progress of the expedition up to date.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

WORLD.

British Empire.—The Howard Vincent Map of the ——, showing the possessions throughout the world of the British People, their extent, population, and revenue, by T. B. Johnston. Equatorial scale 5¼° to an inch. Dedicated to C. E. Howard Vincent, Esq., C.B., M.P. W. & A. K. Johnston, Edinburgh and London, 1886.

This map is on Mercator's projection, and has been drawn at the suggestion of Mr. C. E. Howard Vincent, M.P., to illustrate certain facts connected with the British Possessions in all parts of the world. A small inset map exhibits their extent in 1786, and by comparing this with the larger map we see at a glance the acquisitions made during the past century. At the bottom of the map there is given, in tabulated form, a statement of the areas, populations, and revenues of the possessions of the British people. In addition to this, the positions of all Admiralty and mercantile coaling stations, the boundaries of naval stations, and the distances by the usual routes followed by steamers between the principal parts of the world are given.

EUROPE.

Central-Europa.—Neue Uebersichtskarte von ——, resp. der oesterreichisch-ungarischen Monarchie. Scale 1: 750,000 or 10·3 geographical miles to an inch. Militär geograph. Institute, Wien. Sheets:—C. 5. Ragusa, Mostar. D. 4. Semlin, Alt Orsova, Belgrad, Užice. D. 5. Köprülü, Priština, Scutari. D. 6 Elbasan Argyrokastron, Joannina, Corfù, Philiataes. E. 5. Sofia, Philippopel. F. 5. Constantinopel, Šumla, Adrianopel, Dimotika. Price 2*s.* each sheet. (*Dulau.*)

Elsass-Lothringen.—Wandkarte von ——, von H. Wagner. Scale 1: 200,000, or 2·7 geographical miles to an inch. Schultz & Co. 4 sheets. Price 5*s.* (*Dulau.*)

Europäischen Russland.—Die Eisenbahnen der ——, mit Theilen der angrenzenden Länder und Klein-Asiens. Scale 1: 6,000,000 or 82·1 geographical miles to an inch. Wien, Artaria & Co. Price 1*s.* 6*d.* (*Dulau.*)

West-Russland.—General und Strassenkarte von ——, und den angrenzenden Ländern bis Wien und Budapest, von G. Freytag. Scale 1: 1,500,000 or 20·4 geographical miles to an inch. Wien, Artaria & Co. Price 3*s.* (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued during the month of March 1886.

1-inch—General Maps:—Scotland, sheet 61 (Outline), 1*s.* 9*d.*

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25-inch—Parish Maps:—

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1s.; Lifton, 1s. 6d.; Marystow, 1s.; Milton Abbot, 1s. 6d.; Spàrnham Damerel, 1s.; Throwleton, 1s. 6d.; Stowford, 1s.; Whitchurch, 1s. 6d. **Essex:** Area Book: Canvey Island, 2s. **Glamorganshire:** XI. 4; 4s.; Area Books: Canton, Leckwith, Llandaff, 1s. each; **Gloucestershire:** XLVIII. 13; 4s. 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Area Books: Abberley, Areley Kings, Astley, Bockleton, Broom, Coston Hackett, 1s. each; Chaddesley Corbitt, 1s. 6d.; Crowle, Crutch, Eastham, Eldersfield, Grayton Flyford, Halesowen, Hartlebury, Hasbury, Hill, Hillhampton. Himbleton, Huddington, Hunnington, Illey, Knighton-on-Teme, Kyre Magna, Kyre Parva, Lapal, Lindridge, Lower Mitton, Oddingley, Orleston, Pensax, Redmarley D'Abitot, Rochford, Rock, Salwarpe, Stockton-on-Teme, Stone, Tibberton.

Town Plans—10-feet scale:—

ENGLAND AND WALES: Evesham, XLIX. **3**, 4; 2s. Great Malvern, XXXIX. **8**, 14, 19, 20, 24, 25; XXXIX. **12**, 10, 15, 20, 25; XXXIX. **16**, 5; XL. **5**, 11, 12, 13, 16, 17, 21; XL. **9**, 1, 11, 16, 17, 18, 23; XL. **13**, 1, 6, 11. Huntingdon and Godmanchester, XVIII. **13**, 4, 9, 10, 14, 15, 20, 25; XVIII. **14**, 6, 11, 16, 21; XXII. **2**, 1, 6, 7, 11, 16, 17; 2s. each. Leicester, Index Map, 1s. 7d. Northampton, XLV. **9**, 1, 14; 2s. each. Walsall, LXIII. **11**, 12; 2s. Worcester, XXVIII. **15**, 20, 23, 25; XXVIII. **16**, 16, 21; XXXIII. **3**, 3, 4, 5, 8, 9, 10, 14, 15, 17, 18, 19, 20, 23, 24, 25; XXXIII. **4**, 1, 3, 6, 8, 11, 12, 13, 16, 17, 18, 22, 23; XXXIII. **7**, 3, 4, 5, 8, 9, 10, 13, 14, 18, 19; XXXIII. **8**, 2, 3, 7, 8, 13, 14, 17, 18, 19, 21, 22; XXXIII. **12**, 2.

(*Stanford, Agent.*)

AFRICA.

Afrika.—Spezial-Karte von ———, im Massstab von 1:4,000,000, or 55·5 geographical miles to an inch. (10 Blätt.) Entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domann und Dr. Richard Lüddecke. IV. Lieferung, Inhalt: Sektion Abessinien (6) nebst Bemerkungen von H. Habenicht.

Sektion Delagoa-Bai (10) nebst Bemerkungen von Dr. R. Lüddecke. Gotha, Justus Perthes, 1886. Price 3s. each part. (*Dulau.*)

In the notices which accompany the present issue, the names of all authorities which have been consulted by the compilers, are given. The maps published in the 'Proceedings' of the Royal Geographical Society have been largely drawn on, and in referring to the assistance he has received from the R.G.S. Map of Eastern Equatorial Africa, Herr Habenicht pays a graceful and well-merited compliment to Mr. Ernest G. Ravenstein. He says that having consulted Mr. Ravenstein's map in the compilation of sheet 9 (Abessinien), he finds that, "with his customary diligence, that gentleman has worked up all materials, and further on, speaks of him as one of the first living authorities on the cartographical literature of Africa. The longitude assigned to Khartum on sheet 9 is the same as that given on Ravenstein's map. On sheet 10 the lower course of the Zambesi has been taken from the Portuguese maps, but as has been already remarked in previous notices of new maps of this region, there appear to be unaccountable discrepancies in surveys made by Portuguese officers at different periods, and it seems likely that future investigation may show that the course of this river as laid down by Mr. Ravenstein may prove to be the more accurate of the two, founded as it is on the MS. material of Baines and Thornton, both of whom were capable men. The two sheets of which the present issue is composed, are quite in keeping with those previously published, and there now only remain two sheets to complete the finest map of the African Continent that has ever been given to the world.

AMERICA.

Brazil.—Mappo do ——, por V. J. C. à l'échelle de 1:5,000,000, or 66·6 geographical miles to an inch. Paris, Guillard, Aillaud et Cie. (*Dulau.*)

CHARTS.

North Atlantic Ocean.—Pilot Chart of the ——, April 1886. Published at the Hydrographic Office, Navy Department, Washington, D.C., J. R. Bartlett, Commander U.S N., Hydrographer to the Bureau of Navigation.

ATLASES.

Afrika.—Atlas von ——. 50 colorirte Karten auf 18 Tafeln. Mit einem geographisch-statistischen Text. Wien, Pest, Leipzig. A. Hartleben's Verlag, 1886. Price 3s. (*Trübner & Co.*)

This is an excellent little atlas, and contains a large amount of valuable information with regard to Africa. There are, however, as might be expected, some errors and omissions; this is apparent in the hydrography of the general maps, especially in the great central lakes. Again, in the map of South Africa, the British Protectorate of Betchuana Land is not noticed, though every German colony is very distinctly laid down. With these, and such like exceptions, the maps and plans are well and clearly drawn. It contains seventeen principal, and thirty-three inset maps on which are shown the political, ethnographical, physical, and meteorological conditions of Africa; there are also fourteen pages of explanatory letterpress.

Berghaus, Prof. Dr. Hermann.— Berghaus' Physikalischer Atlas. (Begründet 1836 von Heinrich Berghaus) 75 Karten in sieben Abteilungen, enthaltend mehrere Hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. Gustav Hartlaub, Dr. Georg Neumayer, Dr. Karl v. Zittel, herausgegeben von Prof. Dr. Hermann Berghaus. Erste Lieferung: Inhalt: Prospectus. No. 24. Mittelländisches und Schwarzes Meer. No. 27. Jahres-Isothermen. No. 47. Florenkarte von Europa. Gotha, Justus Perthes, 1886. Price 3s. each part. (*Dulau.*)

This atlas promises to supply a want which has for many years been felt

by all students of physical geography. The atlases containing physical maps hitherto published, either in this country or Germany, though at the time they were brought out, they were justly considered admirable works, are now behind date, inasmuch as they do not contain the latest results of scientific inquiry and exploration; indeed, it would be difficult to mention anything more needed by those engaged in geographical study, than such an atlas as that which is now under consideration, promises to be. As the method in which the atlas is to be published is mentioned in connection with the title, it will be unnecessary to refer to it further than to say that the regular issue of each "Lieferung" has been secured by having a certain number of maps finished, and in hand. None of the plates which were used in the old edition will be made use of in the present, the whole of the work being entirely new. As great difficulty would be experienced if an attempt were made to issue the maps in regular consecutive order, the publishers have determined not to do so, and they will be issued quite independently of their position in the atlas. We have an example of this in the present "Lieferung," which contains maps 24, 27, and 47, all of which are most beautifully engraved and coloured.

Canonge, Lieut.-Col. F.—Atlas d'histoire militaire contemporaine (1854–1871) contenant 45 planches, plans, ou croquis, dressé sous la direction du Lieut.-Col. F. Canonge. Paris, Charpentier. Price 1*l.* 5*s.* (*Dulau.*)

Johnston, T. Ruddiman, F.R.G.S.—The Merchant Shipper's and Ocean Traveller's Atlas; compiled for 'The Mercantile Shipping Register' and 'The Daily Recorder of Commerce' by T. Ruddiman Johnston, F.R.G.S. Published at the office of 'The Mercantile Shipping Register' and 'The Daily Record of Commerce,' London, and by T. Ruddiman Johnston, Edinburgh, 1886.

This atlas contains a series of charts on which the particulars of the ocean routes between most of the principal ports of the world are laid down. There are also several plans of harbours and bays on an enlarged scale, but no soundings are given, or anything to indicate the depth of water. With the exception of the rivers, none of the physical features are shown, but the various trade routes which converge at each port, and the railways giving access to the interior, are clearly laid down. Special attention has been devoted to the delineation of the coast-line, and a comparison with the Admiralty charts will show that this has been accurately carried out.

United States.—Scribner's Statistical Atlas of the ——, showing by Graphic Methods, their Present Condition, and their Political, Social, and Industrial development, by Fletcher W. Hewes and Henry Gannett, Chief Geographer of the United States Geological Survey, &c. New York: Charles Scribner's Sons. London: Edward Stanford. Price 8*l.* 8*s.* and 12*l.*

The object of the editors of this atlas has been to bring together, and present by graphic methods, all the leading statistical facts regarding the physical, social, industrial, commercial, and political conditions of the United States. The necessary material for the compilation of this work has been drawn from many sources, but mainly from the reports of the Tenth Census; the reports of the Bureau of Statistics and Education, as well as those of the Treasury Department, have also been laid under heavy contribution, and the editors also acknowledge their obligations to such books as Spofford's American Almanac, which in itself is a most useful statistical work, Poor's Manual of Railroads, and Meech's Life Insurance Tables. The linear method adopted in this atlas to illustrate comparative statistics, has many advantages over other systems, where form or colour are the distinguishing characteristics, as being at once more simple, and effective. Where maps of the United States are employed, they are of three sizes: a folio map, in which the county is the unit of comparison; a State map covering half a page, the data for which have been transferred, with such modifications as the reduction required, from the larger map, plotted by counties; and a map on a still greater reduction, for representing the average of States only. On the folio map each county is numbered, and its name may be readily determined by the aid of the index to Counties. The names of

Territories are written in italics to distinguish them from the names of States. The value of such a work as this can hardly be over-estimated; it contains 112 pages of text, and 151 plates, which are so drawn that, with a very little study, any person of common intelligence would be able to see at a glance the comparative values of all the principal industries, religious denominations, populations, &c., of the several States and Territories. At the commencement of the Atlas an index for each subject is given, with a corresponding letter, and on the edge of the sheets there are indentations marked with the same letter, so that the Atlas may be at once opened at the required place by inserting the finger and turning the upper sheets back. This is doubtless the most perfect work of the kind that has ever been published in America.

Schlachten-Atlas des neunzehnten Jahrhunderts. Zeitraum: 1820 bis zur Gegenwart. Pläne der wichtigsten Schlachten, Gefechte und Belagerungen mit begleitendem Texte nebst Uebersichts-Karten mit compendiösen Darstellungen des Verlaufes der Feldzüge in Europa, Asien und Amerika. Nach authentischen Quellen bearbeitet. I. Lieferung. Inhalt: Der russisch-türkische Feldzug in Bulgarien und Rumelien 1877–78. Nr. 1. Uebersichts-Karte, mit compendiöser Darstellung des Verlaufes des Feldzuges. Nr. 3. Plan des Gefechtes bei Lovea am 3. September 1877, mit Text.—Der nordamerikanische Bürgerkrieg 1861–65. Nr. 4. Plan der Schlacht bei Shiloh am 6. und 7. April 1862, mit Text.—Der deutsch-französische Krieg 1870–71. No. 3. Plan der Schlacht bei Spicheren am 6. August 1870, mit Text. Iglau: Verlag von Paul Bäuerle, 1885. Price 3s. (*Stanford.*)

EDUCATIONAL.

British Isles.—Photo-Relief Map of England. Scale 1 : 1,700,000 or 23·6 geographical miles to an inch.—Photo-relief Map of Scotland. Scale 1 : 1,200,000 or 16·4 geographical miles to an inch. By Henry F. Brion and Rev. Edmund McClure, M.A. Published by the Society for Promoting Christian Knowledge. London, 1886.

Mason, J. W.—Movable Diagram illustrating the Seasons and Day and Night, designed by J. W. Mason. Printed and published by Ruddiman Johnston & Co., Edinburgh and London.

This is an ingenious contrivance for illustrating the cause of the change of the seasons, and the length of the day. It consists of a stout piece of millboard, about two feet square, in one corner of which is fixed a map of the Eastern Hemisphere, drawn on transparent cloth; beneath this is fixed a cardboard disc, one half of which is shaded, and revolving on a pin which is placed in the centre of the map, is connected by an arm with a metal disc representing the sun. It therefore follows that when the sun is placed in any position on an arc, marked with certain dates, the portion of the earth in light, and also that which is in shadow, are distinctly shown. The arc on which the dates are written, indicates the position of the sun in declination, and by looking at the map the student can see at what places on the earth's surface the sun's rays will then fall vertically. To find the length of the day, we have to observe where the line on the cardboard disc, which divides light from shadow, cuts the parallel of 50° of North latitude, and as this is numbered in hours, we have at a glance the hour of sunset on the day against which the disc representing the sun is placed. Of course the hour of sunset would be found for any parallel of latitude that was numbered in the same manner as that of 50° in this instance. There is also given an ordinary diagram of the position of the earth with regard to the sun at certain seasons. In construction this diagram is strong, and the very simple arrangement for moving the cardboard disc is out of sight. It is well calculated to convey to pupils a correct idea of the cause of changes in the seasons, and cannot fail to be of use in clearing away the difficulty which has been experienced by teachers in elementary schools, in their endeavours to teach their pupils the real causes of some of the changes which they witness in nature, but are unable to comprehend.

W. & A.K. Johnston, Edinburgh & London.

Pub.d for the Proceedings of the Royal Geographical Society 1886.

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

A Sketch of the Physical Geography of Brazil.

By JAMES W. WELLS, M. INST. C.E., F.R.G.S.

(Read at the Evening Meeting, February 8th, 1886.)

Map, p. 416.

IN offering this paper to the Society, I must observe that it is not intended to be a description of details of the minor geographical and physical features of the country, for that would require far more space than the limits of this paper can offer; it is proposed simply to indicate and broadly specify the chief natural physical divisions of the empire, their composition and chief points of difference, with the view of endeavouring to convey an impression of the principal characteristics and framework of this great country, that is certainly less known to the general public than Africa.

I have been induced to write this paper, not so much on account of the extraordinary illusions that exist with regard to Brazil, but to the fact that nearly all maps (certainly all English ones) tend to create a most erroneous idea of the country, by representing it to be a very mountainous land, rather than what it is, chiefly a vast plateau, excavated into numerous valleys by denudations, with relatively few purely mountain chains, that is, true mountains of upheaved strata. It is much to be regretted that English map-makers do not avail themselves more of the rich stores of geographical information yearly collected by travellers in all parts of the globe. For instance, it is now nearly ten years since I had the honour to present to this Society information, and a sketch map of a considerable portion of unknown Brazil, wherein was shown the interesting fact, that north-east Brazil is practically an island, but in no English map of the country is yet indicated this fact, whereas both German and Brazilian map-makers have minutely followed my surveys.

A glance at the sketch map will show four main features in the physiognomy of the country. Firstly, the low-lying vast flat plains of

the Amazons, as Humboldt called that great hollow; and the flat grassy plains of the Rio Paraguay. Secondly, the elevated highlands that extend over the major part of the empire, north and south of the Amazons. Thirdly, the yet higher lands that constitute the watersheds of the principal rivers. Fourthly, the groups of mountain ranges consisting of primitive rocks of purely upheaved strata.

This vast area contains naturally so many varying constituent elements, that to deal with them in the short compass of this paper, I am necessarily compelled to treat the subject in the broadest manner possible, commensurate with a facile comprehension of my purpose. With this view, I have divided the whole area into three great hydrographic sections, or systems, and if the positions of their watersheds are retained upon the memory, it will greatly help to a lasting impression of the configuration of the country. I will now trace the course of these divides.

It will be seen that a line of elevations bisects the centre of the South American continent, rising gradually from west to east. Its western section, although such a prominent watershed, consists of a series of groups of wide undulating tablelands, intersected by the numerous sources of the streams that run to the north and to the south. The separation between many of these waters, flowing parallel to each other, yet in opposite directions, is so slight, that in many cases, the basin of the Amazons could with facility be connected with that of the Plate rivers by canals, and communication by water rendered complete from one system to the other. For instance, near the city of Matto Grosso, the Rio Alegre, a feeder of the Amazonian Rio Guaporé, rises in a small elevation jointly with the Rio Agoapehy, a tributary of the Rio Paraguay. These two baby sources of mighty rivers flow eastward, a few miles apart, side by side, for twenty to thirty miles, through undulating grassy country, and many of their own branches are divided from each other by only a few hundred yards, and canoes have been dragged from one stream to the other over the intervening lowland. There are other similar near connections of opposite flowing rivers, separated only by low-lying land; the headwaters of the Tapajos nearly join those of the Rio Sararé, another tributary of the Guaporé, and the Rios Xingu and Araguaya are nearly connected with those of the Paraguay. Near the borders of Matto Grosso and Goyaz, the line of these tablelands bifurcates, one branch trending southward, still in the form of wide elevated flats, the other runs north-east, and assumes more the form of a series of ridges and isolated peaked hills, known as the Serra do Cayapó, and Serra das Divisões do Rio Claro. Near the city of Goyaz the divide becomes distinctly mountainous, and the ranges radiate in all directions; here are the Montes Pyreneos, that constitute, as far as is yet known, the second most elevated ridge in Brazil, attaining to

heights variously estimated at 7700 and 9700 feet above the level of the sea. But beyond this point, as this watershed runs north, and forms the divide between the Tocantins and S. Francisco, it is no more in the form of mountains as is usually depicted on maps, but really as a wide sterile sandy plateau, thinly covered with small scrub and tufts of wiry grasses. In this wide flat ridge a traveller can often journey 100 miles without meeting water, or he can traverse it in a canoe from Barra do Rio Grande, on the Rio S. Francisco, to the mouth of the Rio de Somno, on the Tocantins. A section taken from the mouth of, and up, the Rio Grande, and the rivers Preto and Sapão, to the divide, and down the Rio de Somno to the Tocantins, shows the following heights above sea-level:— Mouth of the Rio Grande on the S. Francisco, 1312 feet; source of the Rio de Somno at the divide, 2140 feet; mouth of the Rio de Somno on the Tocantins, 610 feet; thereby showing a difference of level of 700 feet between the levels of the S. Francisco and Tocantins rivers at these points mentioned. The divide rises from the Rio S. Francisco with fairly regular gradients. On its western side the land drops 400 feet in a few miles, and then falls in very irregular undulating country towards the Tocantins. From Carinhanha on the S. Francisco, another exploration was carried out, that resulted in obtaining another section across this divide. Carinhanha 1514 feet above sea-level; at the summit of the dividing tableland near the Rio Formosa, 2935 feet, and at Flores on the Rio Paranan 1400 feet. In this latter section, both the ascent and descent were very gradual and regular, and no mountain ranges were met with in either case. This high elevated plateau, known as the Serra da Mangabeira, extends to latitude 10° south, where it joins a similar high flat plateau that forms a horseshoe in its course, and constitutes the watershed of the rivers of north-east Brazil. Now returning to the Montes Pyreneos, it will be seen that another continuation of the central ridge proceeds towards, and joins on to the Maritime range, and forms the divide between the S. Francisco and River Plate basins. This again cannot be considered as a mountain range as commonly represented, for the greater part of it consists of great rolling rounded hills, with occasional peaks and many flat-topped tablelands; but as it nears the Maritime range, it becomes more elevated, and terminates in distinct ridges of granitic gneiss, and in hills largely composed of exceedingly rich ironstone.

In this neighbourhood the surface of the land is extremely irregular and mountainous. One range, formerly known as the Serra de Deos te livre (meaning "The Lord deliver you Mountains"), is sufficiently expressive in its name of its rugged paths, deep defiles and precipices. Several years ago, in passing over the Serra das Boas Mortes from Congonhas de Campos, in the basin of the Rio Grande, towards the Rio Parãopeba, a feeder of the Rio S. Francisco, I found the ascent a fairly easy climb, but the descent was quite a scramble down steep mountain

roads, roughly paved with huge blocks and slabs of ironstone, and winding around the sides of precipitous hills. Yet, despite the difficulties of a journey that one forgets to realise after a lapse of twelve years, still are, and always will be, fresh in my memory the recollections of that glorious pure and serene atmosphere, fragrant with the odours of the capim de cheiro, a grass whose perfume is to Brazil what new-mown hay is to England, and how grand and vast was the panorama that I beheld from the summit of the range, of the myriad forms of grass-covered or boulder-strewn crags and peaks of mountains, and, far below, the far-spreading billowy grass-green hills and winding forested valleys, terminating in the clear blue outline of serras that mingled with the light fleecy clouds of the distant horizon.

I had no means with me of calculating the height, but an engineer, who afterwards traversed this range, told me that his aneroid indicated 7800 feet above sea-level; if that is proved true, this range will be much higher than it is usually considered.

The point of intersection of the central watershed with the Maritime range, is geographically a most interesting locality, for its lofty ridges constitute a divide of waters that flow to the four quarters of the compass. See how relatively near the coast are some of the sources of the S. Francisco and River Plate rivers, that flow in opposite directions through thousands of miles of valleys, to their distant outlets in the Atlantic; and probably, of the rains that fall on some of the dividing hills, one part is carried away to the north, the other to the south.

Let us now trace this great Maritime range, the great bulwark of the Brazilian plateau. It commences in the southern province of Rio Grande do Sul; starting from the western boundary of the province on the Rio Uruguay, it proceeds towards the coast in the form of a series of slopes facing the south, and constitutes the southern extremity of the Brazilian plateau; after approaching within a few miles of the coast it accompanies it northwards, sometimes hugging the shore, sometimes many miles inland, until it reaches Cape Frio.

From the summit of its seaward face, the surface of the ground, and the rivers, slope with gentle gradients towards the River Plate basin. In many places where these great bluffs approach the shore, their varied outline, and serried walls covered with forest, their deep recesses, their crags and peaks, present some of the most charming mountainous coast scenery of the world. At Cape Frio it terminates in great scarped hills of granitic gneiss; hoary, time-worn, and weather-beaten—defenders of the coast-line against the encroachments of the sea.

At Rio de Janeiro, this grand line of rocky mountains culminates in the Serra des Orgãos in altitudes 7000 to 8000 feet above the sea. The land-locked bay of this city, surrounded as it is by scattered groups of mountains of this range, presents such marvels of scenery, that no port in the world, not even Naples, Sydney, San Francisco, or Constanti-

nople, can compare with it in its manifold beauties, all must yield the palm to the lovely bay of Rio de Janeiro.

Now leaving the coast range, and proceeding northwards through the great coffee districts, we dip into the valley of the Parahyba, and again ascending, reach the most celebrated ridge in the country, the Serra da Mantequeira. It rises in S. Paulo, where a branch trends northwards and forms one of the walls of the basin of the Rio Grande; the main line continues up the western side of the Parahyba in the form of lofty precipitous wooded slopes, often rising to great boulder-strewn crags and pinnacles. It faces the south, exposed to the moisture-laden winds of the ocean, that are condensed into almost daily rains. Here is situated the Peak of Itatiaia-assu, the most lofty known elevation of Brazil, 10,040 feet above the sea, and only 60 miles from the coast in a straight line. As far as Ouro Preto, the range presents more or less the same character, a long rugged ascent from the south and south-east, and very gentle gradients to the north and west terminating in a great undulating grassy tableland. At, and a little beyond Ouro Preto, it gives birth to innumerable streams, that have excavated deep cavernous valleys, giving the intervening highlands the appearance of mountains that are often really denudation mountains. Some of these ridges of primitive rocks attain great altitudes, notably Itacolumi near Ouro Preto, and the peak of Itambé further north. Beyond Ouro Preto the main range rapidly begins to assume the character of a high tableland, that widens as it advances into Bahia; it crosses this province in great wide sandy plateaus, with an occasional upheaved dyke-like ridge here and there or showing where a local mass of harder materials has resisted the disintegrating and denuding influences of time and weather. Its course is bisected by the Rio S. Francisco, that plunges into the lower seaward plateau, at the great falls of the Paulo Affonso, the Niagara of Brazil. A little further on, in the province of Pernambuco, it joins the eastern arm of the north-eastern watershed, and together the plateaux extend to Cape S. Roque, another prominent advanced outpost of the shore-line.

Thus I have briefly traced the main framework of inland Brazil, the chief bones of the monster, and in following the course of these elevated lands, it will be seen that the rivers of Brazil are divided into three great systems:—the basin of the Amazon, the basin of the Plate rivers, and the many distinct and separate rivers draining into the Atlantic. Taking these riverine systems in the order mentioned, I will endeavour to say something of each, and point out their different prominent characteristics.

In the Amazons system, for the sake of brevity, I have included the Tocantins and Araguaya, yet, although they are not now tributaries of that great river, there is good reason to believe they were formerly, when the river Para was once one of the true mouths of the Amazons.

This Amazons basin is divided into the bottle-shaped low-lying forest

of its upper valley, 1300 miles long by 800 miles broad, and its circumscribing elevated tablelands, that near Obidos and Santarem approach close to the banks of the main river, and constitute the neck of this stupendous bottle-shaped area. Throughout the length of this river, east and west of Obidos, the adjoining land is so low and flat, that we have in many cases rather a series of more or less parallel streams than one great clearly defined stream. It is possible to go in a canoe up the whole of the valley in these lateral channels (locally termed Parana-merins), and also pass through the deep forests by natural canals, from one tributary to another, without once entering the main river.

It is a singular feature of the Amazons valley, lying as it does such a mass of water in the Equatorial regions, that it is so healthy as it really is; some of its tributaries are very insalubrious, and where life in any condition is made a misery by the insect pests; yet I have never met any one who has had an experience of life on the Amazons, who has not become passionately fond of it. The glorious vegetation, the life free from conventionalities, the brilliant sunlight and warmth, tempered by fresh breezes, contain some of the elements of making a paradise, and the numerous lines of river steamers now plying on these majestic waters, afford means for rapid communication, and of obtaining the necessaries and luxuries of life for the settlers.

The vegetation of this great valley is essentially different from what is found in the other two riverine systems; it is vaster, purely tropical in character, and contains a growth and variety peculiar to itself. The rich low-lying lands, subject to annual inundations, frequent rains all the year, and the continual heat, produce a vast wealth of dense tropical verdure, and a forest area greater than can be found in any other part of the globe, intersected by thousands of miles of immense navigable streams, that to the traveller appear more like grand inland seas, rather than rivers.

Amongst the immense stores of valuable vegetable productions of this great forest, the indiarubber-tree figures pre-eminently. It exists in such vast quantities, and the collection of the juice is so very lucrative, that it has attracted to even the most remote rivers thousands of adventurous Brazilians from the adjoining provinces; and despite the hardships, perils, and privations of such a life, still flows on the tide of eager hunters. Rubber is doing to the Amazons what gold did for Australia and California; although most other industries on the Amazons are neglected and paralysed, rubber has enabled Para, Manaos, and other riverine cities to make unprecedented progress, and it has covered thousands of miles of rivers with steamers, and spread a population over vast areas that otherwise would have remained dormant for many many years.

So little relatively is as yet known of the river, that it is still a question of dispute amongst geographers, as to whether the Para river is

one of the mouths of the Amazons or not. When, however, it is remembered, as can be proved, that the quantity of water passing the city of Para is relatively little in excess of what is found at the actual junction of the Tocantins with the waters of the Uanapú, Pacajas, Camaraipy, and Jacundá, there is very little room left for the Amazons water—in fact, the Amazons is only connected with the Para river by a number of narrow *furos*, or channels so narrow, that steamers proceeding through them from Para to the Amazons almost graze the bushes on each side, and the volume of water that can flow through these furos is really insignificant in proportion to the volume of water of the Tocantins group; so I see no reason why the Para river should be considered as one of the mouths of the Amazons. Undoubtedly it was so formerly, but the meeting of the flow of water of the Tocantins group, with the main river, has evidently silted up the old wide channel, of which part still exists, but its western extremity is now closed, and the mass of water of the Amazons finds its way direct to the sea. This exit of the Amazons has not yet been surveyed; I feel convinced that a much better channel could be found here for Atlantic steamers proceeding up the river, rather than through the narrow tortuous channels between Para and that river.

To any one ascending the Amazons river, a most noticeable feature strikes his attention, namely the table-topped hills of the Serras de Ereré and Obidos, and the somewhat similar formation on the opposite bank, at the rear of Santarem. These opposite highlands form the walls of the valley through which the river, once probably a great inland lake, has excavated its way to the sea. It is really a mistake to call these heights Serras, for the word Serra implies a range of hills, or mountains, and the so-called Serras of Ereré are no more entitled to be considered as a mountain range than are our Dover cliffs. Their summits, instead of being ridges, extend in the form of undulating savannahs far inland, ever ascending, furrowed into hollows and valleys by many a stream or watercourse. Strange and interesting as is the appearance of these cliffs of 1000 feet high, yet they are not exceptional to the basin of the Amazons; at its farthest western extremity in the Serra de Cupatí, bordering the banks of the Rio Japura, and also in the western face of the Chapada da Mangabeira, are encountered identical formations, and even to the north, in Roraima and its brother Kukenam, also exists a somewhat similar appearance. These great precipitous bluffs and isolated table-topped hills are indicative, or at least suggestive, of a great denudation that has either long since occurred, or is yet happening. I rather am disposed to the latter supposition, especially in viewing the appearance of the western face of the Chapada da Mangabeira, the Tocantins-S. Francisco watershed; from the S. Francisco it rises gradually and by regular gradients to the divide, where it appears as perpendicular walls of sandstone, with flat summits, and presents an appearance, when viewed from

the east, of gigantic fortresses. The base of these cliffs is composed of a natural earth slope of the modern débris of the fallen material of the walls. That this tableland extended yet further to the west 20, 30, or 60 miles, is evident by the detached groups of flat-topped hills that one meets with at these distances, of identical formations, and many of whose summits are practically level with the main tableland. I have ascended to the top of one of these miniature Roraimas, and found a vegetation and soil precisely similar to that on the great plateau, whereas the vegetation of the surrounding lowlands was quite different in its character. Some of these isolated table-topped hills are split across, and the extremities appear ready at any moment to fall and add their elements to the adjoining lowlands.

The Amazons presents another peculiar characteristic, namely the absence of a delta, for although the exit of the river is amidst the channels of a great archipelago of islands, yet these islands are largely composed of a rocky basis. In fact, rather the reverse of a delta exists, as it can be proved that the sea is encroaching upon and eating away the land faster than the river can deposit its alluvial matter; yet so great is the force of this mighty monarch of rivers, that its discoloured waters can be sighted at sea, 100 miles from land.

The Plate basin differs from the Amazons basin, in the following features. The climate is more variable, the rainy and dry seasons are more distinct. The low plains, instead of being covered with forests, are often vast flat areas of grass and scrub, subject to inundations from the rivers; the vegetation is less tropical in character, in fact, on the Parana and adjoining rivers are considerable forests of the araucaria pine and other trees of temperate regions. The north-east section of this basin consists of part of the undulating great Brazilian plateau, with belts of forest existing only in *the valleys* of the rivers. The Rio Grande and Rio Parana traverse the great southern tableland of the Plate basin, the latter river *entering* the lower level of the plateau at the falls of the "Sete Quedas." This north-east section comprises admirable fields for future colonisation, a fine climate and a good soil, both for grazing and for agriculture, but it requires development of communications; at present a colonist would find the value of his products absorbed in cost of transport. A considerable part of this basin is unpopulated, except by a few poor tribes of Indians; but on the Paraguay, and the extreme north-east, and the section in S. Paulo, Rio Grande, and Parana, near the coast range, there is a considerable population, principally devoted to cattle raising and agriculture, and the railways in S. Paulo and Rio Grande have undoubtedly given a great impetus to the progress of the country, aided as it has been by German and Italian immigrants.

The third division of the empire, containing the rivers flowing from the coast ranges and the central watershed to the Atlantic, also possesses characteristics of its own, different from the Amazons and Plate

basins. In the southern portion, from Rio Grande as far as Rio de Janeiro, the coast range, "Serra do Mar," gives rise to numerous precipitous streams falling into the Atlantic. The Rio S. Francisco, that might well be considered a distinct basin, as it really is, I have included in this section. It is accompanied during the greater part of its course by the bluffs of tablelands on each side of its valley; sometimes they approach near the banks and form healthy situations for townships; at other times the tablelands are only seen 10 or 20 miles away from the river. In almost every case these bluffs or cliffs are designated as Serras, a very great mistake, for they should be called "Taboleiros" (tablelands). Near the village of Jacaré and at São Bom Jezus da Lapa, are some very curious limestone formations; they rise abruptly with perpendicular sides from a plain, their summits are weather-worn into pinnacles, points, and towers, with the interstices filled with the tall, blue, candelabra-like, Munducurú cactus. Their fronts are stained and hoary with time, they look what I believe them to be, the ancient bones of the plateau that once filled the valley, their softer surrounding materials having long since been denuded and carried away to the distant Atlantic. The valley of the S. Francisco is very different from that of the Amazons, in the absence of anything like the vast forest of the latter. The former only shows forest on the immediate banks of the stream, behind which are lower levels of lagoons, accompanying the river on its course; they vary in width from a few yards to a few miles, and often extend to the foot of the adjoining slopes of the tableland. The great part of the lowland of the valley, where not swampy, is covered with a dwarfed, scrubby vegetation, and tracts of grass-lands with occasional small extents of forest. This river in many parts is extremely unhealthy, especially in the upper course. During my surveys there, I resided six months, from December to June, in the river valley near the mouth of the Paraõpeba. I employed within that time some 60 men, one after another; not a man escaped intermittent, or remittent fever, and six of them eventually died. Yet with a little work, these malarious lagoons might easily be drained as the water of the river subsides, and these localities might be turned into extraordinarily rich and fertile lands, instead of being uninhabitable in many parts, as at present.

To the east and north of the S. Francisco valley are the remaining riverine depressions that constitute the rest of the Atlantic river system. Here there are so many rivers, each containing its own basin distinct, that it is impossible in the compass of this paper to mention the numerous little groups; suffice to say that the north-east rivers rise in the elevated ridges of the north-east watershed, and flow by gentle gradients to the sea. The rivers Gurupy, Mearim, Itapucurú, and Parnahyba, are navigable for the greater part of their length, as are also many of the Atlantic rivers from the eastern divide of the S. Francisco. This region, although in many parts much broken up by isolated groups of hills and flat-topped

elevations, is fairly regular. It is subject to great and devastating droughts, that cause an immense amount of misery and suffering.

This third hydrographic division contains within itself the greater part of the population, wealth, and industry of the empire. Its climate varies from the genial climate of 32° south latitude to the damp heat of the Equator, and comprises an immense variety of soil and vegetation, from the forest-clad slopes of the Serra do Mar, and Mantequeira; the woods and plains of Rio de Janeiro; the virgin forests of the Rio Doce; the arid tablelands of Bahia, with their stores of mineral wealth; the rich mineral mountains of Minas Geraes; the sandy tablelands of the head-waters of the north-east division of the empire; the intervening belt of forest at the foot of the coast slopes of the tableland, terminating in the low grass plains, broken by occasional groups of hills.

In reviewing the subjects I have treated, it will be seen that the positions of the highest altitudes are practically in a straight line, for if a line is subtended from Roraima in the most northern extremity of the empire to the peak of Itatiaia-assu, in the south, it will cut through the Montes Pyreneos in Goyaz, with their respective heights of 8600, 10,040, 9700 feet above the level of the sea, the highest being Itatiaia-assu, near the southern coast, and the lowest Roraima in the north.

It is also interesting to note the great depression that extends through the centre of the South American continent, practically similar to what exists in the North American. For instance, a canoe can be navigated from the Rio Orinoco to the Rio Negro, thence to the Amazons, then up the Rios Madeira, Mamoré, Guaporé, and Alegré, here it will not be more than 500 or 600 feet above the sea; the canoe can then be hauled across a low grassy flat, as is often done, to the Rio Agoapehy, then descend by the Rio Jauru and Rio Paraguay, to Buenos Ayres. The distance from the Amazons to the Plate by this route is about 2500 miles, of which 1650 have already been traversed by steamers, leaving yet 850 miles to be navigated. But it must not be inferred that the whole of this route offers an almost uninterrupted course of navigable rivers; on the contrary, the remaining 850 miles that have not been explored by steamers, not only contain insurmountable obstacles to the passage of even the lightest draught steamer, but also in many places even to the ascent of a canoe. Yet this route will most probably be, in the more or less remote future, the main line of internal communication. By far the greater part of the lands of this natural way are as undeveloped as the Congo of Africa—in fact, more so, as the districts are very thinly populated by Indians, and a very few settlers. There is also the connection between the Rio S. Francisco and Rio Tocantins. A canoe can leave the former river and go up the Rios Grande, Preto, and Sapão. The source of this last river is in a beautiful lake in a valley surrounded by fortress-looking table-topped hills; the margins of the lake are bordered by groves of grand

Burity palms (*Mauritia vinifera*); on the west the lake drains out in a quick-flowing considerable stream, the Rio Diogo, joins a Rio Preto, and thence onwards by the Rio do Somno to the Tocantins. This journey could be made without once taking the canoe out of the water, except to descend with safety a few rough bits of water on the western outlet of the lake.

When I explored this route in 1875, a large part of it was unknown and uninhabited, and some of the natives occasionally met were extremely shy, unaccustomed as they were to the sight of white men, especially of travellers; and as I was neither a trader, a planter, a priest, nor a soldier, my personality became a mystery to them, which they finally solved by deciding that I was anti-Christ entering the country with the object of making slaves and heathens of the people, and they were afterwards discovered most fervently offering up prayers for deliverance from the machinations of the evil one.

The temperature of Brazil is not so high as is usually imagined, or as one would suppose from its situation within the tropics. At Pernambuco it rarely exceeds at any time in the day 82°, and descends to 68° in the depth of winter, at night. At Rio de Janeiro the mean temperature of the last thirty-four years was 74°·14. February was the average hottest month at 78°·62, and July the coldest, 69°·26. The most exceptionally hot day was in January 1880, at 99°·50, and the coldest in September 1882, at 50°·36. A two years' residence at S. Antonio, on the Rio Madeira, showed a general highest average, by day, of 82°–88°, and lowest, at night, 69°–75°, but on one or two exceptional occasions the thermometer registered 95°. A six weeks' observation, in March and April, at Carinhanha on the Rio S. Francisco, showed the following minimum and maximum temperatures at various hours during this period:—7 A.M., 64°–78°; at 10 A.M., 70°–85°; at 1 P.M., 72°–89°; at 4 P.M., 74°–92°.

A year's observations in 1874 at Pirapora, on the S. Francisco, near the mouth of the Rio das Velhas, showed the following minimum and maximum temperatures of each month.

January, 63°–93°; February, 64°–95°; March, 63°–94°; April, 64°–91°; May, 64°–83°; June, 49°–86°: July, 45°–90°; August, 46°–88°; September, 60°–98°; October, 64°–90°; November, 67°–88°; December, 67°–96°. This Pirapora is the hottest place I have ever experienced in sixteen years' residence and travelling in Brazil, but it is chiefly owing to an unusual circumstance. Where these observations were taken, the soil consists merely of a covering of a very few inches of earth, with tufts of short grass, over a considerable plain of exceptionally hard sandstone rock. In the daily sunshine the soil is quickly baked, and the rocky subsoil becomes greatly heated, and so is generated such an exceptionally high temperature for Brazil. In Southern Brazil, and in the higher parts of Minas Geraes, there are frosty nights in the winter;

but in the summer, the thermometer registers a higher temperature than in the north of the empire.

It now remains for me to ask attention to the map wherein I have endeavoured to roughly sketch the general appearance of the country. I have purposely exaggerated the aspect of the chief mountain ranges, and the appearance of the plateau, so as to render them clearer of comprehension, and have only shown the chief riverine valleys, the extent of the tablelands, of the Amazons forest, and the limits of the farthest railway extension. The map does not pretend to indicate more, and must not be taken as a guide for any other purpose. For those who require the most trustworthy map of Brazil at present in existence, there is none superior to the German Stieler's Hand Atlas of South America, where is carefully indicated the varied information collected by so many travellers in Brazil, although even that otherwise excellent map is very incorrect in its delineations of many of the main elevations of the country.

It will also be seen that there are many spaces shown without rivers, and that many of the distances between the indicated streams would scale many miles of apparently unwatered areas. I have purposely omitted the minor streams, even when they are known to exist, with the object of rendering the map not too confused. I imagine there is no country on the globe so well watered as Brazil, and my experience leads me to believe that it would be difficult to travel in any part of the country ten miles without meeting water, excepting on the arid tablelands of some of the watersheds. In a survey made down the Parãopeba and Upper S. Francisco, in a distance of 317 miles we passed seventy-seven streams, varying from at least 15 feet wide to a much greater width, besides innumerable smaller streams and watercourses. There are also scores—nay, hundreds—of groups of prominent hills and ridged serras not here indicated; to enter upon their enumeration alone would require far greater scope than the limits of this paper, and would moreover exceed the purpose of this brief sketch.

It will be perceived that vast as is the Amazons forest, it occupies only about one-fourth of the area of the empire; the rest is taken up by the undulating tablelands 1000 to 3000 feet above the sea, mountain ranges rising to 5000 to 10,000 feet, and by the river valleys. In addition, however, to the forests of the Amazons there are the eastern slopes of the Maritime range, that as far as the meridian of Ouro Preto are, or were, primitively covered with indigenous forest growth. In the province of Parana are also considerable tracts of pines and other trees. In most of the valleys are also found long narrow belts of forest bordering the rivers; but the higher intervening ground between the valleys may safely be considered as what is known as chapadas, taboleiros, geraes, campos, cerrados; that is, flat, ridged, or undulating country covered with grass only in places, or in others by grass,

bush, flowering plants, cacti, and dwarf palms, or by the cerrados, a name that cannot be rendered into English as there is nothing in Europe to correspond to it; it practically means thick bush, having much the appearance of a wild neglected English orchard, with dense underwood, bushes, and grasses; the trees are small, distorted in growth and much scattered; they are of extremely hardy varieties, and resist equally heat and cold, wet and drought. These campos lands often extend over great areas; in Goyaz one can travel for several days through such lands without once sighting forest of any kind. The atmosphere of these elevations, especially of the campos, the savannahs, or prairies of Brazil, is most delightful and exhilarating. To thoroughly appreciate it, one must have resided for some time amidst the dark gloom of the forests, in their damp, humid air, impregnated with the myriad odours of fragrant or offensive plants, and of rotting vegetation; worried by the sting and the monotonous drone and hum of insects; bewildered by the maze and tangle of colossal trees and creeping, twining, festooned vines; and experience the sense of grim solitude, and the feeling of low depression that the shady gloom produces, and then emerge, like from night to day, on to these bright breezy uplands, sparkling with sunlight, gemmed with flowers, fragrant with sweet perfumes, and lively with the sounds of birds whistling, screaming, and warbling a noisy concert,—then how one will feel revived and take in the pure, serene atmosphere, full of ozone, eagerly and with boyish inclinations to shout, to gallop your horse, anything to express your feeling of ecstasy and delight!

From the savannahs of Roraima, and the campos of the Amazons, right through Brazil to its southern provinces, is found on these uplands this glorious atmosphere. But delightful as it is, bright and extensive the far-speading landscape, extending far away in great billowy earth-waves here and there shadowed by the passing clouds, and fading into the blue outlines of hills on the horizon, yet this campos land is considered, north of the latitude of Ouro Preto, unfit for anything but pastoral purposes. South of this division the soil improves in richness and moisture, and much of it can be adapted to the cultivation of cereals.

Another characteristic of these uplands, especially of the higher plateaus near the city of Barbacena, is the existence and appearance of numerous great rugged hollows in the sides and slopes of many of the great, rolling, grass-covered hills. These hollows are actually landslips, caused by the existence of springs of water. The aspect of these great natural excavations is picturesque in the extreme, both in form and colour; their sides are worn into every imaginable shape, pinnacles, domes, and pointed towers, buttresses and cavities; ravines, narrow, deep and precipitous, or wide open spaces surrounded by lofty perpendicular walls riven by cracks, and ready to fall, and add yet more to the chaos of boulders and fantastic masses of earth that strew their floors. But it

is in their colour that their great charm lies. The prevailing tint is a deep Indian red, that with the green of the hills and the blue sky above, flecked with glistening white clouds, constitutes a charming combination of tones. Any one of these barrancas, as they are called, offers excellent opportunities to the geologist for the study of the soil, and truly the appearance is often extremely interesting. In many of them are found lying upon beds of sandstone, near the floor of the hollow, extensive deposits of fine laminated clays, varying in thickness, but frequently divided into layers as thin as a sheet of paper, and consisting of an infinite variety of colours of the most opposite tint lying side by side —pink, blue, white, black, grey, orange, crimson, purple, and yellow. Professor Agassiz described precisely similar formations in the valley of the Amazons, and found them resting upon the sandstone beds of the lowest formation. Many of these barrancas, especially in the neighbourhood of São João del Rey, show an upper stratum of white or yellow quartz gravel conglomerate, exceedingly rich in gold, and often gold can be procured from the surrounding earth from top to bottom of the sides, making the hill as it were literally peppered with grains of gold. In that district I have even procured it from the dust of the highways.

A characteristic of Brazil is a rich, red, highly fertile clay soil, that is found scattered over the whole of the country. I have been enabled to trace it in the valley of the Upper Parãopeba; in the neighbourhood of São João del Rey; the mouth of the Rio das Velhas; in the valley of Rio Preto, near Formosa; at Carolina on the Tocantins; and at Chapada in Maranhão. The substance and formation of this material may be briefly described as a sheet of red, unstratified clay, interspersed with pebbles and boulders, overlying the rock in place. This stiff, soft clay contains within itself all the mineralogical elements usually found in old metamorphic rock, such as granite, gneiss, mica, clay-slate, &c.; the boulders are usually masses of a kind of green stone, composed of an equal amount of greenish black hornblende and felspar, and they are entirely foreign to the rocks they often rest upon. It is well known that this formation originated Agassiz's theory of an ancient glacial age in Brazil, but I believe that his views have never been endorsed by any competent geologist, and have been ably and effectively controverted by Sir Charles Lyell. There yet remains a field for scientists to explore in definitely determining this curious phenomenon; but Mr. Buchanan, of the *Challenger*, directed his attention to it, and his theory of its formation is not only probable, but appeals to one's common sense without verging upon the marvellous.

Before concluding, I wish to touch upon two other matters of general interest, although foreign to the subject of this paper:—they are, the extension of railways, and the crisis in Brazil. My remarks must necessarily be brief. I have roughly indicated on the map the present reach of the various lines, and their directions. It will be seen how

trifling is their extent in comparison with the vast areas to the west, yet it should be noted that a great number of these lines have struggled in their infancy with difficulties and obstacles that they will not have to encounter in their future prolongations. I allude to the old times when railways had not been tested in Brazil, and when the country was even a more "terra incognita" than it is now, and capital was so much more difficult to obtain; another obstacle was the climb up the steep hills of the coast that many of these railways have had to encounter. Now that many have reached the upper levels of the tablelands, their future extension to the far west will be, in comparison, easy and less expensive work. It will be seen that Rio de Janeiro, Pernambuco, and Bahia are each struggling towards a common goal, the Rio S. Francisco. But I am afraid that under existing circumstances, their endeavours to reach a common bourne in search of a very problematical traffic, will only end in disappointment, as the river traffic is insufficient for one railway to the coast, let alone four railway outlets. A State line has already been constructed round the falls of Pedro Affonso, and brought the traffic of the upper river in communication with the lower. This line was built by the State to give employment to the starving inhabitants of Ceará during a great famine a few years ago. Its inability to cover its working expenses is a proof that the S. Francisco traffic cannot support a railway. São Paulo is rapidly extending its many railways south and west. Rio de Janeiro is also spreading its lines in all directions; much of this is now being done by national capital and enterprise, national engineers and builders. This initiation of national public works by Brazilians is one of the best signs of the progress of the country.

It has been customary of late years to look upon Brazil as a country subject at any moment to a crash and collapse. Yet, although its financial state is at present very deplorable, compared with other and even with European countries, it is not exceptionally so. I consider that for the last 100 years Brazil has been, unknowingly, slowly recovering from the effects of her precocious infant prosperity, when in those early days of her existence, 1700 to 1800, such fabulous wealth was scraped from the virgin gold and diamond deposits of the interior. The crash really came when the grand old energetic race, of Portuguese adventurers, expired, and left only behind them their effete descendants, demoralised by the opulence inherited from their enterprising ancestors. It is even now as painful as it was 70 years ago, to travel through the old mining centres of Minas Geraes, Bahia, and Goyaz, and see the grand old fazendas, and the many vestiges of great mining operations, abandoned, deserted, grim, and desolate, in their surrounding solitudes. Whole valleys once smiled with prosperous activity and cultivation, where now only patches of plantations are here and there met with, just sufficient to meet local demands. The once grand old homesteads are now the ruinous abodes of squalid poverty and indolent tenants. The increased scarcity and

consequent greater value of slaves and the eventual dearth of Indian labour, and the exhaustion of the facile workings of the mines, combined to hasten, if not produce, this decadence. Yet Brazil is now trying, and struggling effectually to establish her existence on a more firm and solid basis. Formerly, her evanescent wealth was produced in the distant interior, now it is made on the coast, in commerce, agriculture, stable industries, public works, and manufactures, by a new generation of Brazilians full of a spirit of enterprise, and the vast interior must yet remain long unutilised, unless a possible rush for gold ensues, and the country becomes consequently developed like Australia and California. But even if such an event was to happen, existing Brazilian land laws, and mining laws, must be altered, and a practical welcome given to the immigrants.

In conclusion, I only hope that a little knowledge has been gleaned from such a brief sketch of the vast land of Brazil, greater in its area than the United States, greater than the British and second only to the Russian Empire.

In introducing Mr. Wells to the meeting,

The PRESIDENT said the author of the paper had spent no less than seventeen years in Brazil, and, having traversed almost every province of that enormous country, probably knew more about it than any other living Englishman.

After the paper,

Mr. COLIN MACKENZIE said it was a great pleasure to one who, like himself, had spent many happy years in Brazil, to find that the attention of the Royal Geographical Society was at last directed to that neglected country, and no beginning could have been better than the able paper to which they had just listened. He was residing in Rio seventeen years ago when Mr. Wells first arrived there to carry out a very bold and almost unprecedented exploration for the Brazilian Government, in fact, to connect the existing railway Don Pedro Segundo with the river San Francisco, and continue the navigation up the San Francisco until it could be connected with the tributaries of the Amazons, and so reach Pará. The main idea was to have an alternative route in case of war, and the interruption of communication between north and south along the seaboard. The Brazilian Government were highly satisfied with the manner in which Mr. Wells and his companions carried out the scheme. Since then Mr. Wells had gone over the country in every direction. Exploration in South America could not offer the adventitious attractions of other countries. There were no historical empires or ancient races, as in Asia, and explorers were not followed by troops of Cossacks; neither could it offer the great mystery and wonder that had always attached to the name of Africa; but as Mungo Park, Speke and Grant, Livingstone, Cameron, and Stanley, had developed all the wonders of that continent, if the Society would turn its attention to South America, it would perhaps find attractions of a nature far exceeding what had been discovered elsewhere. If the members would read the works of Humboldt, Im Thurn, and Bates, they would get a foretaste of what might be expected when the country had been completely explored. He had the honour of enjoying the friendship of the great American geologist, Professor Hartt, who was engaged to explore the country, but whose premature death brought the work to a close. Professor Hartt had been the geological member of Agassiz's expedition, and when the Brazilian Government decided to have an exploration of the whole empire they sent for

Professor Hartt. He had been engaged nearly three years, when his death by yellow fever at Rio stopped the whole survey. After he had been at work for two years, he (Mr. Mackenzie) asked him whether he had yet arrived at any generalisation with respect to the physical geography of Brazil, and his answer was, "Yes, all that lies south of the Amazons valley within the region of Brazil has been at a period of geological time an immense plateau, and all the changes that that plateau has undergone arise entirely from the action of water denudation and the scouring out of valleys by the perpetual rains and the rivers." When two men, each working from his own point of view, a scientific geologist like Professor Hartt, and an able civil engineer like Mr. Wells, had arrived at the same conclusion, it could hardly be doubted that that conclusion was a sound one. People who had travelled both in the United States and in Brazil, seeing that the latter was perhaps more fertile than the former, had wondered why there had not been the same development as in the former. The reason was to be found in its physical geography. The Mississippi, with its great affluents the Ohio and Missouri, ran from north to south, through an immense region of diversified climate and productions, without obstruction, enabling settlers to reach any kind of climate or soil that they preferred, and affording an easy means of exporting their produce. The Amazons, however, ran from west to east, through a region containing practically the same products, and with a climate to some extent enervating in its character, where the temptation had been for the inhabitants to content themselves with gathering indiarubber and medicinal herbs. The result was that the Amazons valley was not at all settled, except by a sparse, nomadic race of Indians; whereas the Mississippi valley enabled the most energetic race in Europe to make for themselves homes there. The same remark applied to other portions of Brazil. The misfortune was that the great watershed had its slope inwards, away from the coast. Mr. Wells had pointed out the edge of the plateau coming up to the sea-shore. It was clear that as long as the inhabitants had no railways, they must export their produce along the rivers, but on exploring them, it was found that every one precipitated itself by gigantic falls into the lower country. Until the introduction of railways, therefore, the interior of Brazil was practically closed against settlement. At San Paulo the range came down close to the head of the navigable portion of the river, and as long as the people were confined to river communication the crop was something like 300,000 bags of coffee a year. Twenty years ago, through the skill of English engineers, Messrs. Brunlees and Fox, a wonderful railway was constructed from the sea-coast up the range to the interior. So difficult was the task, that they had to invent a new system of inclined planes; but the moment the line was made the province began to prosper, and on the fertile plateaus the people constructed their own railways, with easy gradients, which served as feeders, and now the produce of the province was six times greater than it was when the railway was first opened. The other obstacle to the opening up of Brazil had been slavery. Fortunately the time could now be clearly seen when that would come to an end. There had been three epochs in its destruction. There were, first, the treaties with Great Britain in 1831, but which were not put into full force till 1853, and, as a matter of positive fact, no slaves had been introduced into Brazil since 1853. Secondly, in 1871, the law was passed that all children, even those of slave parents, born on and after that date, should be born free. And last year a law was passed which gave slavery its final blow. By that law all slaves, as soon as they reached the age of sixty-five, became free, and a large proportion of the taxes was set apart as an Emancipation Fund, and distributed every year for the setting free of a further number of slaves. It was estimated, by those who did not take a too sanguine view of the case, that in nine or ten years not a slave would be left in Brazil. The country would then be opened up to

European immigration. The climate might be unsuitable to immigrants from the Germanic and Scandinavian parts of Europe, but it was the natural region for the outflow of those who were accustomed to the hot countries of the Mediterranean. The fact was that those who had prospered best there were Portuguese, Spaniards, and Italians, and he believed that in a few years Brazil would become an outlet for the surplus population of the Latin races.

Colonel G. E. Church said he did not agree with the last speaker as to the capacity of Brazil as a field for emigrants. Like all tropical countries, it had very valuable products which, after being planted, took a long time before coming to maturity. An emigrant was usually a poor man, who desired to reap his crop within a few months of planting it, and consequently sought countries which would enable him to realise this desire; but if he grew coffee, it must be three or four years before he could expect any return. He therefore required more capital than he generally possessed. Another feature about Brazil was that it was possible almost mathematically to judge of the distance to which an immigrant could penetrate the country and cultivate with advantage, owing to the tariffs on the railways, which ranged from sixpence to two shillings per ton per mile. These tariffs also made it easy to calculate how far a railway could penetrate before its extension would be stopped. The climate of Brazil in its southern part was, no doubt, well adapted for immigrants, and he believed it was being filled up by them at the rate of 10,000 a year, mostly Italians and Germans, and after the disappearance of slavery he had no doubt that those provinces would be rapidly filled. The products of the temperate zone could there be cultivated, such as maize and wheat; and cattle-runs could be formed, which would yield an early return for the outlay. The first start for immigrants should be in the southern parts of Brazil, and as they gradually filled up and wealth increased an expansion would take place towards the north. Several efforts had been made to colonise the Amazons valley, but they had been lamentable failures, and he did not think that Brazil could hope to very largely increase its immigrants while the vast fields of the Argentine Republic were still open to settlers.

Sir Harry Verney, M.P., said it appeared from the paper that it was possible to go by canoes from the Orinoco all the way through the interior of Brazil down to the river Plate, and that corresponded exactly with what Sir Woodbine Parish told him at Buenos Ayres, that in former times the Portuguese had ascended from the Amazons, and the Spaniards from the river Plate, and fought on the marshes of Matto Grosso in the interior of the country. When he was in that part of the world, an officer came across from Lima in Peru to the head-waters of the Amazons, and told him that 3000 miles from the mouth of the Amazons there was a basin formed by the junction of different rivers, so large that it would contain the whole British fleet, and the water so deep that the largest ships could ascend up to that place. Rio was a very beautiful spot. When he was there, there was a large party, some of whom had travelled all over the world, and every one confessed that Rio Janeiro was the most beautiful scene he had ever witnessed. He could not exaggerate the horror of the slave trade that was carried on there. A great change had, however, taken place, thanks to the efforts of the anti-slavery party here, and the wisdom of the present Emperor. When he was about to be presented to the Emperor, the English Ambassador whispered in his ear, "There is not one person here who would not cut your throat for a dollar;" but the Emperor was so intelligent a man that he had carried out wonderful improvements. Brazil was one of the most wonderful countries in the world, and he believed that it would become of the greatest importance in commercial and trading operations with England. While he was there, 3000 immigrants were brought over from Ireland, decoyed by the promise of land being given them. Instead of that, they were obliged to serve in the army, and one-half

of them were murdered by the negroes. Mr. Wells' paper showed that great improvements had taken place, and he hoped that Englishmen would now be induced to take a greater interest in such a beautiful and valuable country.

The PRESIDENT said that under the beneficent sway of the present Emperor, Brazil had become the greatest coffee-producing country in the world. He had been informed that the exports of coffee amounted to 12,000 tons, while from all the other countries of the world it was only 3000 tons. When the Congo railway was made, and the country civilised, there would probably be a formidable rival to Brazil. The description that Mr. Wells had given of Brazil reminded him in some respects of North America. South America had no central desert, no arid central zone, but the great rivers rose close to one another and bifurcated in different directions. In the province of Alberta, in the Rockies, there were the sources of the Missouri, the Milk river, the Saskatchewan, and the Mackenzie. The denudation that had been spoken of in Brazil was also to be seen in the foot-hills of the Rocky Mountains, and there were many isolated hills rising like walls, which were called buttes.

A Journey in South-western China, from Ssŭ-ch'uan to Western Yünnan.

By ALEX. HOSIE, H.B.M. Consular Service, China.

(Read at the Evening Meeting, February 22nd, 1886.)

Map, p. 416.

SIX centuries ago, the great Venetian traveller Marco Polo traversed the kingdom of the great Khan. Since that time dynasties have come and gone; Change, the constant companion of Time, has laid his relentless hand on language, manners, and people, and even on the face of nature. The China of to-day reflects little of the splendour and magnificence which characterised her in the days of Polo. But, although the corruption of conservatism gnaws at her vitals, she is still a great nation, and although her people, when tested by Western standards, are found wanting, they still possess qualities which, if developed, may raise her to be a powerful factor in the future. The conservatism of her rulers has, to within recent times, preserved her remoter provinces a *terra incognita* to the nations of the west; but the march of events has forced her most reluctantly to open up step by step her innermost recesses to the unwelcome barbarian.

A sad event, still fresh in the memories of men, the murder of the lamented Margary, compelled her to remove the barriers erected throughout her western provinces. Since then, several pioneers have overrun these vast territories, and, as one of these, I purpose to lay before you an account of a part of the work that has fallen to my hands.

In my appointment in 1881 as Her Majesty's agent at Ch'ung-ch'ing, the greatest commercial centre in Western China, I saw an opportunity presented to me of extending to my countrymen a wider knowledge of

the commercial and physical geography of this only partly explored region, and, needless to say, I was elated at the prospect. Some of the results of my work have already seen the light in the shape of three Parliamentary papers published between the years 1883 and 1885; but as they are burdened with details of no special interest to the general public, and, as in many places I followed the footsteps of previous explorers, I have thought it best to lay before this Society an account of my travels over practically new ground.

On the 11th of February, 1883, I set out from Ch'ung-ch'ing for the purpose of exploring the country lying between Ning-yuan Fu, the southernmost prefectural city in the province of Ssŭ-ch'uan, and Ta-li Fu in western Yünnan. In 1872 Baron Richthofen had marked out this as his own field for exploration; but he was unfortunately compelled to relinquish the attempt at the first pass that lies between the capital of Ssŭ-ch'uan and the valley of Chien-ch'ang. In 1878 Mr. Baber reached the city of Ning-yuan, but he was bent, and you know with what success, on making himself more intimately acquainted with the River of Golden Sand, and his course lay south, east, and north, back to the province of Ssŭ-ch'uan. From Ch'ung-ch'ing we proceeded to Ch'êng-tu the capital of the province, by way of the salt springs of Tzŭ-liu-ching —the route of another famous explorer, the late Captain Gill. From Ch'êng-tu our road lay south-west past Ya-chou Fu, the centre of the brick-tea manufacture, over the Ta-hsiang-ling pass to Ch'ing-ch'i Hsien, whence branches the great trade highway to Ta-chien-lu and Tibet, across the Ta-tu river, through Yüeh-hsi T'ing, and over the Hsiao-hsiang-ling Mountains, in crossing whose snowy ranges many of our followers were struck down with fever, to Lu-ku, situated near the junction of the two streams which form the head-waters of the An-ning river, and at the northern end of the great plain of Ning-yuan. Only twenty odd miles now separated us from the city of that name; but owing to the sickness of our followers, who happily began to recover in the face of the southern breezes blowing the very breath of life into their fevered and toil-worn frames, we had to divide the distance over a couple of days, and early in the afternoon of the 19th of March we crossed the last spur which projects into the plain from the hills which form its eastern bounndary, and passing through the beautifully cultivated and well-wooded gardens in the suburbs and through a busy thoroughfare alive with pack-animals laden with long hollow cones of salt, we entered the West gate of Ning-yuan, more generally known in Western China as Chien-ch'ang Fu. Mr. Baber has fully described the catastrophe which, in the early years of the Ming dynasty, is said to have befallen the former city of Ning-yuan, whose ruins are declared to lie buried at the bottom of the beautiful lake to the south-east of the present site. If this tradition be true, the lake had no existence when Marco Polo passed through Caindu, and yet we find him mentioning a

lake in the country in which pearls are found. Curiously enough, although I had not read the Venetian's narrative of his travels in Caindu, one of the many things told me regarding the lake was that pearls are found in it, and specimens were brought to me for inspection.

On leaving Ning-yuan we skirted the western edge of the lake and made for the low hills which bound the plain to the south-west. Eight miles from the city we struck the left bank of the An-ning river, and having effected a passage at the ferry, we proceeded south over a sandy waste, whereon close reed fences were erected to keep the sand from being blown over the cultivated ground. Farther south the plain was dotted with mud houses and villages, and the plots of arable land by which they were surrounded were thickly edged with mulberry trees. The plain from Lu-ku, southwards, is noted throughout Western China for its fertility; but from that point until south of Ning-yuan the river flows under the lofty hills bounding the western edge of the plain which slopes gently from east to west, and its waters are little available for purposes of irrigation. The plain, therefore, depends for the most part upon the rainfall for its water supply, and as rain had not fallen for a month previous to our arrival, the cracked and arid ground, with its stunted crops of poppy, wheat, and beans, presented a striking contrast to the glowing description we had received of this happy Eldorado. South of Ning-yuan, however, the plain is perfectly level, and the river winding about in it is extensively utilised for irrigating the fields. Although fortune usually smiles upon the valley of Chien-ch'ang, the inhabitants of its many villages are not to outward appearances a happy race. What strikes the traveller most with regard to them is the prevalence of the unsightly goitre. Neither sex nor age is exempt. The natives attribute it to the inferior salt from the brine wells of Pai-yen-ching within the jurisdiction of Yen-yuan Hsien, and their argument is that north of Ning-yuang Fu the salt supply comes from the northern salt springs, and that where this salt is consumed goitre is exceedingly rare, while south of Ning-yuan only local salt is used, and goitre is excessively common. This can hardly be reconciled with the statements made to me by the inhabitants of the mountainous regions of the province of Kuei-chou through which I passed in 1882, and where goitre is remarkably prevalent. They were unanimously of opinion that the disease is due to the salt from the northern springs of Ssŭ-ch'uan which supply the entire province of Kuei-chou. But the true origin of the disease is doubtless to be ascribed to calcareous and other substances held in solution in the water supply of the districts.

The small town of 'Ho-hsi, "West of the River," the first stage from Ning-yuan, lies in a bend at the foot of a mountain range, which forms the divide of the An-ning and Ya-lung rivers. It, too, has its story of war with nature. A small stream from the western mountains flows through the town on its way to join the river in the plain. In

1881 a terrific hailstorm swept over mountain and plain; the stream became a roaring torrent, and annihilated nearly the whole town; and the mortality of killed and drowned is estimated at a thousand souls.

Following up the stream towards its source we attained, after a few hours' climb, the ridge of the mountain where the roads are worn out of the solid limestone, to a depth of twelve feet, by the constant traffic between the salt springs to the south-west and Ning-yuan Fu. The steep eastern slope of the mountain was covered with rank coarse grass; nor did cultivation appear until the ridge was crossed. Even then, there were only a few clearings here and there, and these were occupied by the large-leaved privet, the pear and other fruit trees, while the uncultivated ground was clad with stunted pine. Beyond the ridge, the road—a mere bridle-path—runs west by south along the mountain side, whence we could make out to the south the green waters of the Ya-lung river, flowing north-east and suddenly bending southwards, its progress in the former direction being obstructed by a mountain barrier. As might be expected in such a country, the population is very scant, and only an occasional hut for the refreshment of the traveller was to be seen during a day's journey.

Our resting-place during the night of our second stage from Ning-yuan was the village of Tei-li-pao, overlooking the Ya-lung river, which we reached by a steep descent on the following morning. Ascending its left bank for four miles, through dense hedges of prickly pear, growing with a profusion we have not seen elsewhere in Western China, we crossed it at the ferry of Ho-pien Hsün, a customs station on its right bank. The river itself, which is about two hundred yards in breadth, is deep, and flows with an even current until it reaches the sharp bend which I have already mentioned, when it lashes itself into foamy billows against submerged rocks. The Ya-lung is unnavigable, and the only craft on its green waters were three ferry boats, some thirty feet long. From the bed of shingle which lies below the customs station we followed for a short distance the right bank, which is here lined with huge boulders, and then turned south-west up a gully, down which flows a streamlet to the main river. The country gradually opens out, and cultivation, which had practically ceased since we left the Ning-yuan plain, began to reappear on the gentler slopes of the mountain sides to the south-east. Our struggles on the precipitous banks of the Ya-lung had, we imagined, earned a good night's repose at the little town of Hang-chou, which lies on the left bank of the streamlet. In this, however, we were sadly disappointed. Surmounting a low eminence, we beheld, to our surprise, little but its charred remains, the town having been destroyed by fire only a few days before. On entering, we found, as might have been expected, wretched accommodation. The homeless inhabitants were huddled together in the few houses that had escaped the ravages of the fire. The mass of idlers seemed to

require some outlet for the superfluous energy which had not yet been expended in the rebuilding of their homes. Our arrival was their opportunity. No sooner had we settled down in the apartment which we had the greatest difficulty in procuring than we were surrounded by a gaping and insolent crowd. So insolent and threatening indeed did they become, that we had to solicit the intervention of the local authority in suppressing what to every appearance was fast becoming a riot. He came, but his presence was powerless, and his commands were unheeded. He left, and matters assumed a still more serious aspect. A free fight thereupon resulted between the rioters and my followers. At this point my intervention became necessary, and for the first and only time during my wanderings in China I was compelled to show my revolver. Happily for all, the sight of the weapon was sufficient, and under its awe-inspiring muzzle, four of the ringleaders who had threatened us with death were arrested. This quelled the riot for the night, but threats were thrown out for vengeance on the morrow. The local authority was duly warned, and he was good enough to promise us all available protection, and to accompany us on the next stage. When day dawned he was duly present, and we were glad to shake the dust of inhospitable Hang-chou and its riotous inhabitants from our feet.

The valley in which Hang-chou lies, contracts towards the south-west. Recrossing the stream, the road runs along the mountain side for some distance; but the mountains soon recede, leaving an undulating stretch of country, rising as we advanced. This we ascended amid low pines and dense underwood, past numerous unworked copper mines, until at the brow the road is at an elevation little under the mountain peaks on both sides, now white with snow. Here a thunder-storm delayed our progress; the brilliancy of the lightning and the roar of the thunder echoed and re-echoed from the surrounding mountains, reflecting credit on the forgers of Zeus. But the chilly hail and the rude mud hut in which we were compelled to seek shelter for the night, speedily turned our thoughts from the dreams of classical romance to the stern actualities of a wanderer's life. The local authority of Hang-chou, however, pressed on with his prisoners to the city of Yen-yuan Hsien where our non-arrival excited no little consternation among the authorities, who, anxious as to our safety, sent messengers and soldiers to ascertain the cause. With the exception of a short distance where the road zigzags, the descent to Yen-yuan is easy. We followed a small mountain stream down a valley for some time, leaving it by a fine level road to the west, and soon entered the city which lies on the north-east side of a plain backed by a range of high hills running east and west. Here due satisfaction was given to us for the outrage at Hang-chou, whose inhabitants, through their unwilling representatives, were taught a practical lesson as to the treatment of strangers from the West.

The city of Yen-yuan, though small, is the capital of the district which borders on the province of Yünnan, a district rich in copper and salt, and one of the chief habitats of that industrious and interesting creature the white wax insect, which is propagated on the branches of the *Ligustrum lucidum*, or large-leaved privet. The brine-wells from which the salt is derived lie fourteen miles to the south-west of the city at Pai-yen-ching, which we reached by a good road across the plain down which flow one or two rivulets north-westwards. The way in which the farmers manipulate these rivulets for purposes of irrigation is truly wonderful: here the water ripples in one direction, there in exactly the opposite. This plain is one of the very few places in the province of Ssŭ-ch'uan where carts can be utilised for transport. The brine-wells of Pai-yen-ching differ in many respects from the more famous wells of Tzŭ-liu-ching, which lie between Ch'ung ch'ing and Ch'êng-tu, and which we visited on our way to the country now under description. They are only two in number, and comparatively shallow, being only fifty feet in depth. At Tzŭ-liu-ching, on the other hand, the wells may be counted by hundreds, and many of them attain a depth of two to three thousand feet. Their great depth necessitates the use of elaborate, but not scientific, machinery for raising the brine. At Pai-yen-ching bamboo tubes, ropes, and buffaloes are dispensed with, and small wooden tubs with bamboos fixed to their sides for raising handles are considered sufficient. At one of the walls a staging was erected half-way down, and from it the tubs of brine were passed up to the workmen above. Passing from the wells to the evaporating sheds, we found a series of mud furnaces with round holes on the top into which cone-shaped pans, manufactured from iron obtained in the neighbourhood, and varying in height from one to two and a half feet, were loosely fitted. When a pan has been sufficiently heated, a ladleful of the brine is poured into it, and, bubbling up to the surface, it sinks, leaving a saline deposit on the inside of the pan. This process is repeated until a layer, some four inches thick and corresponding to the shape of the pan is formed, when the salt is removed as a hollow cone ready for market. Care must be taken to keep the bottom of the pan moist; otherwise the salt cone would crack and be rendered unfit for the rough carriage which it experiences on the backs of pack animals. A soft coal, which is found just under the surface of the yellow-soiled hills, seven miles to the west of Pai-yen-ching, is the fuel used in the furnaces. At Tzŭ-liu-ching a gas, which is drawn off in bamboo tubes from pits in the immediate vicinity of the chief brine-wells, is utilised to evaporate the salt, and there the pans are broad and shallow. The total daily output of salt at the Pai-yen-ching wells does not exceed two tons a day, and the cost at the wells, including the Government tax, amounts to about three-halfpence a pound. The area of supply, owing to the country being sparsely populated, is greater than the output would lead one to expect.

At the time when Marco Polo passed through Caindu, this country was in the possession of the Sifans, and there can be little doubt that the salt cakes which then constituted the currency were evaporated at these very wells.

Our progress—I hardly like to use the word—during the five days from the brine-wells of Pai-yen-ching to the frontier of the province of Yünnan, a distance of less than forty miles as the crow flies, is one long story of mountain travelling. Several times did we approach the frontier, but as often were we driven back, south and south-east, by impenetrable mountain barriers covered with pine forests. To the south the ranges run east and west, and a day's work, sometimes lasting as long as thirteen hours, consisted in climbing and descending steep mountain sides, and in endeavouring, with but poor success, to circumvent the huge boulders which lay in the beds of the streams in the bottom lands, between the mountain ranges, where the road should have been. Cultivation, as can readily be imagined, was not conspicuous in such a country; but here we found in abundance the animal best suited to rugged mountains—the goat. Its flesh, too, was greatly appreciated where rice could not be procured, and where our supplies had long since run short. To the west of our route we found many places inhabited by Mantzŭ tribes, whose districts, however, lie principally beyond the frontier. At Shao-shang, on the last ridge which has to be crossed before reaching Yünnan, six Lolos, deputed by their chief, who had been apprised of our approach by the Chinese authorities, awaited us to pay their respects, and as we stood looking at the mountain ranges within the southern province, one of them, tall and powerful, every inch a king, stepped forth and did us homage. Here, then, on the very borders of Ssŭ-ch'uan and Yünnan, we find the Lolo from the east, the Mantzŭ from the west, and the Chinese holding the narrow strip of land which separates these alien races. Alien races, and what a contrast! On the east the Lolo, still retaining his distinctive costume, one of a nation hemmed in, but not absorbed, by the Chinese—on the contrary, able to raid and carry off into slavery the people of the country bordering on his territories; on the west the Mantzŭ, clad in a garb differing little from that of his conquerors, timid, and ready to flee at the approach of a stranger. The Mantzŭ women, however, like the women of all these different tribes scattered through Western China, retain the costume of their race, and, though on a less elaborate scale, dress very much like their European sisters. But the latter have not yet donned the turban, nor do they care to walk about with unshod feet.

The little border town of Hui-lung-ch'ang, or Mien-hua-ti as it is locally called, lies at the base of a high mountain range running east and west. From the summit of the range, which was attained after a five hours' climb, we could make out to the south-west seven other

ranges with similar directions, and in the far south a clear glittering ribbon marked the position of the Chin-sha Chiang, the head-waters of the mighty Yangtze. The tops of these sandstone ranges were clad with dark pines, while the slopes were covered with rank grass and shrubbery, among which herds of ponies and water buffaloes and flocks of sheep and goats were feeding. From Chiu-ya-p'ing, a mud-walled town of some 5000 inhabitants surrounded by the two Mantzŭ tribes—the Li-su and the Pai-yi—two stages to the south of the Ssŭ-ch'uan–Yünnan frontier, two roads lead to Yung-pei T'ing, the first departmental city within the latter province, and, although we selected what was described to us as the easier, we were obliged to make a long detour, and, instead of entering the city from the north, we actually approached it from the south. It lies in the centre of a plain some five miles long and two broad, bounded on the north by a semicircle of mountains, on the east by a lofty range running north and south, on the west by gentle hills, and on the south by low sandstone ridges fast disintegrating and drifting into the plain. To the south and east of these ridges were numerous pools of water and a rivulet whose edges and banks were covered with thin coatings of soda. Yung-pei itself is a city of very little importance. The plain on which it stands has a stiff clayey soil, and the beans and poppy were decidedly below the average of Ssŭ-ch'uan crops. It is, however, the point where the Burmese trade with Yünnan by way of Ta-li Fu stops, and as such deserves mention.

From Yung-pei the road runs south-west to the edge of the plain, and then over hills clad with pine and oak, until a large expanse of water lying in a plain running north and south comes into view. On the hill-side east of the plain we saw the first traces of the great highway which, prior to the Mahommedan rebellion, is said to have connected Ta-li Fu with Ssŭ-ch'uan; but rank grass and shrubbery have all but obliterated the remains of the broad paved roadway. The lake, a fine sheet of clear water, is 10 miles long, and at its broadest part about five miles across, and the road, here also paved, skirts its eastern shore. On Chinese maps the lake is called the Ch'êng 'Hai; but the only name known to the villagers living on its shores is the Hei-wu 'Hai-tzŭ, the "Lake of the Black Mist." Numerous mud villages and houses dot the plain, but they are all in an advanced stage of decay, and their inhabitants are evidently well acquainted with poverty, being miserably clad even for a hot climate.

We crossed and recrossed the plain to the south of the lake in search of the river which is represented on all maps of China that I have seen as connecting the lake with the Chin-sha Chiang, or Chin Chiang, the Brius of Marco Polo. We searched in vain: we crossed one or two deep nullahs containing a little water trickling not from, but to the lake. Further south, however, a brooklet rising in the east of the plain and strengthened by another from the west flows down to the Chin-sha

Chiang. As the river is approached, the plain (a great part of which was lying waste while the remainder was growing crops of sugar-cane, cotton, poppy, and beans) contracts, and is blocked to the south by low hills, on reaching which the road turns west and south-west to the market town of Chin-chiang-kai on the left bank of the Golden River. At this point the river presents a striking contrast to its appearance as it flows through the central and eastern provinces of China. About 300 yards in breadth, its clear waters flow gently east through a bed of shingle, soon, however, to be cooped up in wild mountain gorges, and ultimately to issue as a turbid muddy river, to become more turbid and muddy as it nears the sea. The river was still low: the melted snows from the Tibetan mountains had not yet descended to stir the quietude of its crystal waters, but the granite foundations on which the houses of Chin-chiang-kai are built, strongly shored as they are with wooden planks at a height of 50 feet above the shingle bed, indicate the addition which the present waters may annually expect. Mr. Baber has already disposed of the question of the navigability of the river at a point very much farther east, and I need only remark that the queries put by me to the ferrymen on this subject were met with smiles that suggested doubts as to my sanity. A few hundred yards to the west of the town of Chin-chiang-kai, where we had been warmly received by the local authorities on the previous evening, and where we enjoyed a good night's repose undisturbed by the low murmurings of the waters on the pebbly strand, we crossed the river at a point where, flowing northwards, it bends sharply to the east. The road runs south along the soft shingle forming the right bank of the river, which is frequently concealed in its deep sandy bed as it skirts the western edge of the plain. Anon it touches the eastern edge, and at this point we looked up a long reach of the river as it flows from the west eastward till blocked by bold rocky heights which have repulsed its attacks, it has been compelled to seek a northern course. The roadway crosses these rocky heights and descends to the right bank of a stream which is lost in the mighty river at the bend.

The plain or valley down which flows the stream has a most unenviable notoriety. Little can be seen in it but the ruins caused by the Mahommedan rebellion. Here a town enclosed by four walls, with open gates and streets covered with wild grass, deserted, desolate; there the remains of houses and villages concealed under a luxuriant growth of shrubbery and cactus. Notice, too, the blackened walls which have been licked by the flames that accompanied the swords of the Mahommedans or their conquerors. Sad enough truly; but not all. A dreadful plague annually sweeps down the valley and mows down its inhabitants. Can it be wondered that few people care to risk their existence in the plague-stricken hollow, and that accommodation unworthy of the name is all that can be obtained? We managed to distribute our

followers over the small village of Huang-chia-p'ing; but I was unfortunate enough to be laid up with an attack of fever which compelled us to remain for a couple of days in a small mud stable without door or window.

But we were within three days' journey of Ta-li Fu, and the hope of reaching a state of comparative comfort spurred us on in spite of our enfeebled condition. From Huang-chia-p'ing the road at first runs west through uncultivated ground. Stone dykes peeping out here and there through rank grass and cactus, were the only traces of former cultivation; but as the road turns south-west, patches of poppy and wheat began to appear along the banks of the stream flowing north-east down the valley, and the farther we advanced, the more numerous became the signs of tillage, while the slopes of the mountains flanking the valley were covered with tall grass and dwarf fir and oak. As we approached Ta-wang-miao, our eyes were gladdened, though the picture was blurred and imperfect, by the first glimpse, through the white hot haze of the afternoon sun, of the summits of the Tsang-shan range capped with snow, at the base of which lies Ta-li Fu, the capital of Western Carajan.

Dense hedgerows of sweetbriar and bramble in full bloom lined the pathway to the north and south of Ta-wang-miao, and greatly impeded our advance. At a distance from the pathway patches of ground were arrayed in the purple and white flowers of the poppy, while high up, white shining gravestones peeped out from the tall grass with which the hills on both sides of the valley were covered. A ridge still hid all but the summits of the Tsang-shan from our view; but when we had traversed the reddish flat which stretches north-west from the brow, a magnificent panorama of plain, mountain, and lake lay before us. We struck the eastern rim of the plain near the northern shore of the Erh Hai, in whose crystal waters, stretching southwards, the snow-capped summits of the range bounding the western edge of the plain were clearly reflected. We felt as we gazed on the brilliant picture that we were more than rewarded for our toilsome journey. Descending the eastern rim we soon reached the northern margin of the lake, in skirting which we crossed a couple of streams which enter it from the north. A small temple perched on a rocky height stands clear out of the waters which wash the northern shore of the lake. Than such a spot it would have been hard to find a better vantage ground from which to view the picture. The valleys to the north were full of poppies, and the white fields which stretched along the western shore confused the eye as they were lost in the glitter of the lake. The villages to the north of Shan-kuan are inhabited by a race called the Min-chia, who differ in manners, language, and to a certain extent in dress from the Chinese. Like the Man-tzŭ, they are timid in the extreme and afraid that by fraternising with a stranger they might compromise themselves

with the Chinese. As we entered the "Upper Fortress" we thought of the members of the French Commission, who, in 1868, narrowly escaped from it with their lives, and of the stout-hearted missionary who braved the anger of the Sultan on their behalf. Père Leguilcher still lives; he no longer hides in caves and woods, but spends a peaceful life within the very walls of Ta-li itself. At Shang-kuan we made the acquaintance of several Ku-tsung, a Tibetan tribe inhabiting the country to the north-west of Li-chiang Fu; but the term Ku-tsung is also applied by the people of Ta-li to Tibetans generally, and is synonymous with the Hsi-tsang of other parts of China. The road from Shang-kuan runs south along the plain, dividing the cultivated land which stretches east to the edge of the lake from the stony and rougher ground which stretches west to the bases of the Tsang-shan, near which it is covered with mounds—the resting-places of the dead. Passing through the ruins which line the approach to the city, we entered the north gate of the capital of Western Carajan, and were welcomed by the Chinese authorities, and no less heartily by the French and English missionaries within its walls.

It will be observed that throughout this paper I have confined myself to a mere description of the country; but I should state that one of the main objects of my journeyings was to look at Western China from a commercial point of view, to visit new markets for British manufactures, and to endeavour to discover how these markets could best be reached. It is admitted by every traveller in the western and south-western provinces of China that Ssŭ-ch'uan is the most important of them all; that it contains a population five times as large as either Kuei-chou or Yünnan, a population at once peaceful, industrious, and comparatively rich, eager to buy our manufactures if these can be placed on the market at a reasonable price. It must not be supposed, however, that the thirty million inhabitants of Ssŭ-ch'uan are all struggling to buy British manufactures. No. The Ssŭ-ch'uanese are themselves a great manufacturing people, and although little cotton is grown in the province, the value of the raw material imported from the central provinces does not fall short of a million pounds sterling. The cotton looms send forth a material, rough no doubt, but substantial and more suited to the wants of the peasantry and the porters, who in a mountainous province like Ssŭ-ch'uan form no inconsiderable proportion of the population, than our own manufactures. Nor are the products of these looms confined to Ssŭ-ch'uan: they are distributed in large quantities through the provinces of Kuei-chou and Yünnan. The total value of the trade of Ch'ung-ch'ing, the commercial key of Ssŭ-ch'uan, amounts to more than eight millions sterling annually, and when I say that two-thirds of this trade consists of exports, and that the imports of foreign manufacture figure for only one-eighth of the whole trade, it will be seen to what extent our trade with Western China, and more particularly with Ssŭ-

ch'uan, is capable of development. By what route, then, does this immense volume of trade pass? I answer, by the river Yangtsze. But it may be asked, Why has this development been retarded? Why have not the advantages granted to British commerce by the Agreement of Chefoo, which gave the great impulse to trade with Western China, been utilised? Simply because shipowners do not care to risk their vessels west of Ichang, the highest open port on the Yangtsze and the highest point yet reached by steamers. That there are dangers for the first 100 miles above Ichang I admit; but they have been absurdly exaggerated, and from personal experience I have no hesitation in saying that during the greater part of the year they could be easily passed by a powerful steamer of light draught. At present our manufactures are tracked in junks all the way from Ichang to Ch'ung-ch'ing, a journey which occupies from one to two months and entails a heavy addition to the price of the goods.

But in order to realise the benefits that would accrue to British trade from the introduction of steam communication west of Ichang, we must examine the subject a little more closely. Our manufactures intended for Ssŭ-ch'uan, when landed at Hankow or Ichang, have paid an import duty. At these two ports, the owners, whether native or foreign, may, on payment of a transit duty, obtain transit passes under which the goods may be carried to their destination in the province of Ssŭ-ch'uan without additional taxation. That destination is for all practical purposes the great trade emporium of Ch'ung-ch'ing, whence the Ssŭ-ch'uan merchants mostly draw their supplies. Arrived at this point, then, the goods have paid an import duty and a transit duty; and immediately they leave the Ch'ung-ch'ing duty-free area for distribution throughout the province, they are further liable to a *likin* duty, and in some instances to an *octroi* in addition. With Ch'ung-ch'ing an open port—and all that is required to ensure this is the ascent of a steamer—our manufactures could be laid down there on payment of the tariff import duty only, and *there* transit passes would, on payment of transit duty, be issued to cover goods destined for any market in the province, which they should reach without any additional taxation whatever.

I have already stated that Yung-pei T'ing is the terminus in a northern direction of the Burmese trade with Yünnan by way of Bhamo and Ta-li Fu, and considering the nature of the country I have endeavoured to describe, I think that there is little probability of trade between Western Yünnan and Ssŭ-ch'uan ever extending beyond that point. Even granting that goods could be carried as far as Ning-yuan Fu, the difficulties north of that city, as I know from personal experience, are greater than to the south of it. And if trade there is to be, it must go north, for the mountainous tract of country lying between the Ta-tu river in the north, and the Chin-sha Chiang in the south, is in-

habited by independent Lolo tribes, and impassable even to the Chinese themselves. Three other routes still remain between Yünnan and Ssŭ-ch'uan. They are:—(1) the route from Yünnan Fu through the prefectures of Tung-ch'uan and Chao-tung to Hsü-chou Fu (Sui Fu) at the junction of the Min river and the Chin-sha Chiang; (2) the route from Yünnan Fu through Western Kuei-chou to the Yung-ning river and Lu Chou on the north bank of the Great River; and (3) the route from Yünnan Fu to Kuei-yang Fu, the capital of Kuei-chou, and thence northwards to Ch'ung-ch'ing. The best of these routes, all of which I have traversed, is the second, namely, from Yünnan Fu through the west of Kuei-chou. These routes I have described elsewhere, and I need only say here that they all pass through very mountainous country, and should foreign goods ever find their way through the province of Yünnan to Ssŭ-ch'uan by any of these routes, I "shall," as Mr. Baber has said of the probability of the extension of British trade between Bhamo and Yünnan, "be delighted and astonished in about equal proportions."

After the paper,

Mr. JOHN THOMSON said that in 1871 he made an expedition up the Yang-tsze-kiang as far as Ssŭ-ch'uan in order to make a survey of the river between Hankow and Ichang. The time of the year was January, when the Yang-tsze reached its lowest point, being at its maximum in July and August. His object was to ascertain whether it was possible at low-water to navigate steamers of light draught up to the new port. He quite agreed with Mr. Hosie as to the practicability of such navigation, even beyond Ichang through the gorges. There were some difficult places, but none insurmountable. The conclusion he arrived at was that a survey at any particular period in one year would not apply to the river at the same period the following year, in consequence of the immense quantity of detritus brought down by the Yang-tsze. In the gorges above Ichang the river rose at least 100 feet from the lowest to the highest level, and masses of rock were hurled down during the wet season. Between Hankow and Ichang, a few miles from Hankow, there was an extraordinary bend of the river. The Chinese vessels went 20 miles round the bend, but a cutting of one mile across would avoid such a circuitous route. It was, perhaps, the most picturesque part of the Yang-tzse. In 1870 there was a great flood, and the foreign settlement, which was previously 60 feet above the river, was under water. The floods were caused by the confluence of three rivers, which reached their highest destructive power at Hankow. The three rivers were the Yang-tsze, the Ya-lung, and the Chin-cha-chiang. In 1870, the floods wrecked a great part of the city of Han-yung, and caused the inhabitants to migrate to the hills, where they remained until the floods subsided. Great distress was annually caused by these floods in the Province of Hupeh. The greatest obstacle to navigation above Ichang was the Tsing-tan rapid, which at the time of his visit was running eight knots an hour, and at one point made a sheer descent of eight feet. The Chinese, however, descended it at all seasons of the year, taking the precaution, however, to unship their goods previously, and re-ship them lower down. The strength of the current was so great that 50 to 100 men were required to drag a boat along. At a place called Patung he found coal-mines abutting on the river bank, and other mines further inland. Baron Richthofen had stated that there was coal enough in that part of the basin of the Yang-tsze to keep the whole world supplied for several thousand years; but the Chinese still went on scraping the outside soil,

and mixing the coal with clay, which they cast in moulds and sold the fuel so made at 5s. a ton at the pit's mouth.

Mr. M. Beazeley said that Mr. Hosie had accomplished a most difficult and rather hazardous journey with very great tact and discretion. He himself had always found, even in places where the Chinese had never before seen a European, that he could make extremely good way with them by forbearance and good nature, and not repelling their advances. He had not the advantage of speaking the language, but if through the interpreter he was able to amuse them, and raise a laugh, he could always succeed with them, for the Chinese were extremely ready to see a joke. The paper had mentioned the white fields of poppies. It was well known that in Sechuen great quantities of opium were grown, and it now appeared that right down to Tali-fu fields of poppies were met with. This was a most significant fact, for Englishmen who were not connected with China, commonly supposed that opium was forced upon the Chinese against their will, but the fact was that where they could not get the Indian opium they grew it themselves. Mr. Hosie had described the brine wells as being from 2000 to 3000 feet deep, but he should like to know if those immense depths had been verified, and how the Chinese sank the wells. The Yang-tzse was perfectly navigable up to Ichang, but beyond that it was not, as far as was at present known. Mr. Hosie had said that steamers of light draught would be available, but that could only be at times of high water, when the current was so strong that steamers would have great difficulty in making way against it. This showed the necessity for constructing railways in China, if only to supplement the navigation of the rivers, which were often dangerous, and much obstructed by rapids. Yünnan was very rich in minerals, and if railways were made there, the mineral wealth might be brought down to the coast, and English goods carried into the interior. There were many places in the eastern part of China where railways could be made with very little difficulty. From Tien-tsin to Pekin was as flat as a board the whole way, and from Hong Kong to Canton a railway might easily be made, when once the hills at the back of Kow-loon were surmounted. It would not then be very difficult to carry a line from Canton to Hankow, the distance, as the crow flies, being about 500 miles, though the line itself would be 680 miles in length. The line from Tien-tsin to Pekin would connect a city of over 2,000,000 inhabitants with its own port. Hankow, with its suburbs across the river, also had a population of 2,000,000, and Canton probably 1,500,000. Vast cities would thus be connected if railways were made, and if the Chinese Government gave permission for their construction, he did not think there would be any difficulty in finding the capital in this country.

The President, in proposing a vote of thanks to Mr. Hosie, said he was not very sanguine that a railway would soon be made to Yünnan. The other day when a paper was to be read on a railway through Siam, he asked a prominent Chinaman to be present, but the answer was "Chinamen don't like railways." He explained that the paper would only deal with the possibility of approaching the frontier of China, but the answer again was "Chinamen don't like a railway anywhere near the frontier." It was, however, of great importance that this question should be pressed, in order that fresh openings might be found for commerce.

On the Island of Diego Garcia of the Chagos Group.

By Gilbert C. Bourne, B.A., F.L.S.

The island of Diego Garcia, lying in S. lat. 7° 13′, E. long. 72° 23′, has attracted very little attention until the last few years. It was surveyed by Captain Moresby in 1837, and a short account of the island written by him will be found in the 'Foreign Quarterly Review' for 1845; it is also mentioned more than once by Mr. Darwin in his celebrated work on Coral Reefs. The geographical position of the island, which lies almost exactly in the direct track from Cape Guardafui to Cape Leeuwin, and its large and deep harbour, have recently raised it into some importance as a coaling station for steamers bound for Australia viâ the Suez Canal, so that a short description of it by one who has spent several months there, may be of interest.

Diego Garcia is a member of the Chagos group, and like the rest of the adjoining islands is entirely formed of coral; it is a low-lying atoll of irregular shape, its greatest length from north to south being 12½ nautical miles, and its greatest breadth from east to west 6¼ miles. Unlike the other atolls of the group, its lagoon is nearly entirely surrounded by land, but there are four openings to the north and north-west, separated by the three small islets known as West or Bird Island, Middle Island, and East Island. The westernmost passage is scarcely deserving of the name, for in it the reef rises nearly to the surface, and the greater part of it is left dry at low tide. There is a passage a mile and a half wide between West Island and Middle Island, the eastern third of which is not navigable, for here the reef rises to the surface, but the remaining western portion is from six to eight fathoms deep, and easily navigable by the largest ships. The passage between Middle Island and East Island is not more than four cables wide, but attains a depth of 15 fathoms; the tides run with great violence through this passage, and it is not practicable for ships because of the numerous coral patches which rise to within a fathom or two of the surface, just within it. East Island is nine cables distant from the main island, and this passage is from four to five fathoms deep, but difficult to navigate on account of the coral patches in it. The continuous strip of land which encircles the lagoon on the east, south, and west, is on the average a third of a mile in width; at one point it is scarcely more than 20 yards across, but at north-west point it is as much as a mile broad. This strip of land rises but a few feet above the water at high tides, except in places where the wind has piled up banks of sand to a height of 25 feet. The whole of the land is densely covered with coco-nut palms and other vegetation, chiefly with the so-called manioc bush, *Scævola kœnigii* and *Tournefortia argentea*.

The lagoon has an average depth of 11 fathoms, attaining a greatest depth of 18 fathoms. Numerous coral patches rise within it, some

reaching the surface of the water, others lying two or three fathoms beneath it, but in spite of these it is navigable in all but its most southern portion, and forms a splendid harbour. The courses to the two coaling stations have been carefully buoyed out.

The south-east trade-winds blow steadily for the six months from April to September; for the remaining six months the island comes more or less within the influence of the north-west monsoon, and during this period calms are frequent, with heavy falls of rain. The season of the south-east trades is considered the dry season, and that of the monsoon the wet season, but in 1885 this was reversed, and the south-east trades brought torrents of rain every day. It would be scarcely beside the truth to say that rain may be expected every day at Diego Garcia—that at least was my experience of the island, but droughts of as much as a month's duration have been known there. The temperature ranges from 86° F. in the daytime, to 78° F. at night, the thermometer rarely exceeding these limits. Although the heat is not excessive, combined with the great humidity of the atmosphere, it becomes very trying to European constitutions, and even the heat itself may become almost unbearable, for in rooms which were not open to a thorough current of air, I have known the thermometer to go up to 102° F. But in spite of its enervating character the climate must be considered healthy; there are no malarious or other fevers in the island, the most common illnesses being rheumatism, brought on by the damp, and colic, which is caused by poor food and the brackish water.

Water may be obtained almost in any part of the island by digging to a depth of 6 feet, but it is rather brackish, and filtered rain-water is preferable for drinking purposes. The soil throughout the island is, as may be supposed, poor. Along the shore on either hand it consists of little more than coral sand or blocks, but on these the *Scævola* and *Tournefortia* have obtained so firm a hold that impenetrable masses of low bush bar the way to the shore. The interior parts of the mainland show for the most part a black peaty mould several inches deep, formed principally by the fallen and decayed leaves of the coco-nut palms. On this a considerable number of plants and trees thrive, most of them being common tropical weeds identical with those of Mauritius and the Seychelles. Few of the trees grow to any size, or are useful for their timber; the "bois de feu" (*Guettarda speciosa*), and the "bois malgache" (*Cordia subcordata*) furnish excellent wood for building or repairing small boats, but do not grow to any great size. Several clumps of *Casuarina equisetifolia* occur on the east side of the island and form conspicuous landmarks, with their tall thread-like tops waving above the mass of coco-nut palms. The "bois blanc" (*Hernandia peltata* and *H. ovigera*) are common, and may attain to a considerable size; the natives use an infusion of the flowers as a medicine in gonorrheal complaints. In many old guides and directories a large tree, the

"bois Mapan," is spoken of as occurring on these islands; this tree is stated to attain to an enormous size, to grow rapidly, and as quickly to fall into decay. In size and name this tree is a fable; a species of *Pisonia* (*P. inermis*) called "mapou" by the natives, is not uncommon, and is in some cases of considerable, though never of gigantic, size; it is almost universally distributed on coral formations, being possessed of large glutinous seed-capsules, which are particularly favourable for transmission by birds.

There is a single group of large trees confined to a single spot on the north-east of the main island, known by the native name of "gaiac" (*Afzelia bijuga*), but it never propagates itself, because, as I am told, the seeds, which are large and sweet and contained in pods, are invariably eaten by rats. A few specimens of the wild cotton plant, *Gossypium barbadense*, are found on the island, but the remainder of the flora consists chiefly of inconspicuous tropical weeds of no interest or value. Mr. J. G. Baker, in his 'Flora of Mauritius and the Seychelles,' mentions an endemic fern, *Asplenium æquabile*, as occurring in Diego Garcia, but after a prolonged search I failed to find a single specimen, and can scarcely think that it exists. A few grasses are found which form a tolerably thick turf in some parts, and supply food for numerous donkeys which have been imported to turn the oil-mills, but hitherto all attempts to introduce cattle and sheep have failed. Cattle do not thrive in the climate, and sheep and goats have invariably been destroyed by the donkeys, who actively resent the presence of these intruders on their pastures.

In the gardens on the estates of East Point, Minni Minny, and Point Marianne, bananas, custard apples, bitter oranges, and a few other tropical fruits are grown, but all attempts to introduce potatoes and vegetables have failed owing to the swarms of land-crabs of the genus *Gecarcinus*, which destroy the roots and tubers.

The staple produce of the island is coco-nut oil, of which some 50,000 gallons are exported annually. Formerly the island was divided into several estates, each belonging to a private owner. The chief of these were Point Marianne estate on the west side, L'Ance David estate on the south-east side, East Point and Minni Minny estates on the east side. There are substantial houses at Point Marianne, East Point, and Minni Minny. The oil-mills and storehouses are close to these houses, and the labourers live in huts at a short distance from them. For some years past the whole island has been in the hands of a single company in Mauritius, of which colony Diego Garcia is a dependency. The present manager, M. Jules Leconte, resides at East Point, and his sub-manager, M. Lemasson, at Point Marianne. During my stay I was most hospitably entertained by M. Leconte, and have to thank him for his invariable kindness and courtesy in assisting me in the natural history researches which were the object of my visit.

The labour on the estates is almost wholly supplied from Mauritius;

very few of the labourers have been born on the island. Those that have are known as "enfants des îles," and are a fine set of men, superior both morally and physically to the imported labourers from Mauritius. The latter are generally engaged for a term of three years, and consist mostly of Mauritius negroes, with a few pure Africans and Hindoos. A large number of worthless and even criminal characters generally manage to find their way over, and have been the cause of a great deal of trouble before there were any proper means of enforcing the law. Nearly all the work done is task work, for the average negro, if set to work for a certain number of hours in the day, will manage to waste an inconceivable amount of time, and to do such a minimum of useful labour as would astonish even a "knight of labour" in more civilised countries. The tasks set are so light that an active man, by working hard for the first three days of the week, will often have finished his week's work on the Wednesday night, and will spend the rest of the week in fishing and amusement.

Properly speaking, there is no cultivation of the coco-nut; the palms have existed on the island from time immemorial, and sow themselves, only in a few places have they been artificially planted. Each palm will bear an abundance of coco-nuts for four or five years in succession, after which it remains comparatively unfruitful for another three years or more. The nuts when ripe fall on the ground, whence they are gathered by parties of men sent out in boats for the purpose. The daily task of each labourer is to collect, husk, and deliver at the habitation 350 coco-nuts per diem. This is performed in a surprisingly short space of time when the nuts have not to be carried far by boat. Each party of men is in charge of a commander or *sarang*, who measures out a piece of ground on which each labourer is to work. The labourer collects the required number of coco-nuts into a heap, and then sticking a short broad-bladed spear into the ground, he takes each coco-nut, spits it upon the spear, and in a couple of wrenches has stripped off the husk and thrown the nut on one side. On their arrival at the habitation the nuts are counted on the beach, and delivered to the women whose duty it is to break them and extract the kernel. The daily task of each woman is to break 1300 coco-nuts in the day, but I am told that they are able to break as many as 2500 in ten hours. The kernels, which are now known as *copra*, are then exposed to the sun in heaps, to allow of an incipient fermentation setting in, but are carefully protected from the rain by a sort of pent-house on wheels, which can be run over the heaps at a minute's notice. After an exposure of two or three days, 250 lbs. of *copra* are delivered to each mill, this being the amount which each mill-labourer is required to grind daily; from it about 30 gallons of oil are produced. The mills used are of a most primitive pattern. The body of the mill is a hollow cylinder of hard wood, in which an upright beam of the same material is made to rotate, the

motive power being supplied by three or four donkeys harnessed to a long horizontal beam, which is connected to the upright by a chain, and is weighted at the far end by two or three large lumps of coral. The *copra* is put in at the top of the cylinder, and the oil escapes by a hole at the bottom. This oil is merely strained through cloths and allowed to settle for a few days, after which it is run off into large vats, and is ready to be collected in casks and shipped for export. All the oil is exported to Mauritius by the oil company's ship, which calls three times a year at Diego Garcia and the adjoining atoll of Peros Banhos. No use is made of the coco-nut fibre, though it is valuable for a variety of purposes; hundreds of tons of it are lying rotting in all parts of the island, which if gathered and picked would, one would think, add very greatly to the annual value of the produce.

The negroes are well lodged in huts made of wood and thatched with palm-leaves. There are nearly 300 negroes in the employ of the oil company, their usual rate of wages being eight rupees per month, with a fixed quantity of rice and oil for food. Fish are abundant in the harbour, and are easily caught; most of the negroes also keep fowls, so that food is plentiful. With light work, abundance of food, a healthy climate, and free hospital attendance for those who may be sick or hurt by accident, the negroes ought to lead a very happy and contented life; and so they do, provided that they are kept strictly in hand, and prevented from getting spirits. No spirits are allowed to be sold on the island, and no man is allowed to buy more than a limited quantity of a rough red wine from his employer every day. But in spite of precautions spirits sometimes find their way in from passing ships, and their introduction is invariably followed by trouble. All the negroes wear sheath knives in their belts, which are speedily drawn in a drunken quarrel, and ugly wounds are not infrequently inflicted. Until quite recently there were no proper means of enforcing the law on the island. Employers were empowered to deal summarily with insubordination and petty offences; in case of graver offences the men were imprisoned until a magistrate came on an annual visit from Mauritius, or until the offenders could be sent in the company's ship to be tried by the higher courts there; but in fact the employers were entirely in the hands of the negroes, who, in the case of a general and organised outbreak, could easily have made themselves masters of the island. The white men could only keep order by a wise exercise of their power, yet, although they have always shown a remarkable discretion in this respect, there have more than once been dangerous outbreaks, fomented by worthless characters who have come over from Mauritius. M. Leconte told me that on his arrival on the island three years ago, he found the negroes in a most insubordinate condition, and that within a month of his landing, his verandah was besieged by a body of thirty men, armed with knives and bludgeons, who declared that they would not leave the place until

they had taken his life. Luckily for him they were as cowardly as they were insolent, and he was able to keep them at bay by presenting a revolver, until he had succeeded in reducing them to a more reasonable state of mind. Thanks to his excellent management, I found on my arrival that the negroes were most peaceably disposed, and the ringleader of that very outbreak was one of the most civil-spoken and best workmen on the estate. On the establishment of two coaling stations four years ago, a number of ships entered the harbour in the course of the year, and the absence of the arm of the law soon became intolerable, but it was not until November 1885, that a police officer, with a proper staff of constables, arrived on the island, and established a police office at the old habitation of Minni Minny, which had been acquired by the Government of Mauritius for that purpose.

As in Mauritius, French, or the dialect known as Creole, is the language spoken in this English possession. The negroes are nominally Roman Catholics, but no priest is resident on the island, nor is there any arrangement for religious or any other education. Under such circumstances it is not surprising that their religion is merely a superstition, and is valueless as a means of moral control. This little group of coral islands, isolated in the midst of a vast ocean, is entirely cut off from the civilising influences of the outer world. Considering their small size, their poor soil, and their remote situation, it is wonderful to think how admirably they have been managed in times past by a few white men, whose sole support in cases of difficulty has been their own energy and strength of character.

The coaling stations on Diego Garcia have only been established in recent years; they belong respectively to the Orient Steam Navigation Company, and to Mr. W. Lund, of London. The station of the former, which is the larger and better appointed, is situated on East Island, the largest of the three islets which stand in the mouth of the harbour. The hulks from which the ships take coal, stand in the harbour at a distance of a mile and a half from the island. Mr. Lund's station, although on a smaller scale, and further from the entrance to the lagoon, is in a much superior position. It lies close to the oil company's habitation at East Point, where it has the advantage of a depth of five and six fathoms of water close inshore, and complete shelter from the force of the prevailing winds. At the Orient Company's station on the other hand, the lagoon is often very rough during the south-east trades, rendering it difficult to lay the hulks or lighters alongside of steamers. During my stay from September to January last, the Orient Company ships called every fortnight, every alternate ship, outward and homeward, stopping there. Mr. Lund's ships called at different intervals, and H.M.S. *Briton* and a German man-of-war were there. The German line of steamers now running from Hamburg to Australia are to call there for coals, and rumour says that the Messageries Maritimes ships are shortly to give up

their route viâ Mauritius, and will call at Diego Garcia on their way to Australia. Thus Diego may be considered to have attained to some importance as one of the coaling stations of the world; but whether it will be of the importance in case of war that some people attribute to it, is a matter which I leave to experts to judge. H.M.S. *Rambler*, commanded by Captain Hon. F. P. Vereker, made a careful survey of the island in May 1885, and I have even heard that it is proposed to protect the island by some sort of fortification, but how this is to be done, and of what use it would be to fortify an island 10 feet high, which might be completely commanded by a ship sailing outside of it, I am at a loss to know.

My object in visiting this remote island was to study the fauna and flora, and to make a collection of the little-known corals of this part of the Indian Ocean. The land fauna and flora are, as may be supposed, very scanty. Of the flora I have already spoken, the fauna is even less interesting. Rats have found their way on the island from ships, and do great havoc among the coco-nuts, but there are no indigenous Mammalia or Amphibia. The Mauritian gecko (*Platydactylus mauritanicus*) is very common, and a mud tortoise is found in some of the marshy pools on the main island. There are only fifteen species of birds, of which only one, the Mascarene weaver bird, is a true land bird, and this has probably been brought over by man. Three species of terns breed in countless numbers on the undisturbed parts of the island, and were laying when I arrived on September 15th; the negroes soon made great havoc among their eggs. Frigate birds and boobies are abundant, but I did not see a single tropic bird during my visit, and was told that they very rarely visit the island. The remaining birds all belong to the order of Waders; they comprise two species of heron—a whimbrel, a small plover, a sandpiper, and an African wading bird, *Dromas ardeola*.

The insect fauna is poor in species, but rich in individuals, especially in common flies, huge cockroaches, mosquitoes, and ants; these are a perfect pest. I was surprised at the almost entire absence of small coleoptera; after repeated searches I only succeeded in capturing a few small specimens of a single species. The most numerous and most peculiar inhabitants of the land are the crabs. Swarms of ordinary land crabs, of three species, are found all over the island, and as I have said, prevent any garden vegetables from being grown. The most remarkable inhabitant is the so-called palm-crab, *Birgus latro;* it is not a true crab, but a member of the Macrura, and comes under the family of Cœnobitidæ or hermit and soldier-crabs. Being too large to hide its abdomen in a shell, it has, in the course of development, obtained large dorsal plates over the primitively soft skin of the posterior part of the body. Its habits are well known from the descriptions of previous writers, but since I have heard several people express their doubts of its being able to climb a palm, I may state that I have seen it do so.

It does not, however, attack the coco-nuts on the trees, but eats only those that are lying on the ground, ascending the palms solely for shade and protection. It is not very common at Diego, and being nocturnal in its habits is not easy to observe; it does not live in captivity.

Green turtles visit the island, chiefly during the south-east trades, and the hawksbill turtle is fairly common during the north-west monsoons. The flesh of the latter, as is well known, is poisonous, but the carapace yields the valuable tortoiseshell of commerce. An average sized turtle will yield from three to five pounds of tortoiseshell, and as three or four of these "carêts" are captured every week, tortoiseshell may be reckoned as one of the valuable productions of the island. The usual mode of capturing the turtles is to watch in the early morning for the females which come to deposit their eggs in the sand, then to cut off their retreat from the sea and turn them over on their backs. Sometimes a female thus captured is secured by a rope tied round its fore-limb and allowed to regain the sea, when it will usually attract two or three males to it. The "carêts" are often speared from boats as they swim in the lagoon, but it requires considerable skill to drive the harpoon through the stout carapace with sufficient force to secure the prize.

To describe the immense and varied marine fauna that abounds around this, as around all other coral islands, requires a paper on natural history. From an economical point of view the fishes are the most important forms; they abound both within and without the lagoon, and most of them are excellent eating. The negroes ate the various Scaroids and trigger-fishes with impunity, and I did not find that any of them were rejected as poisonous, nor that any of the species of Scarus required special preparation to make them fit for the table, as is the case in the Keeling Islands. M. Leconte informed me that several species of fishes are eaten with impunity at Diego Garcia which are considered poisonous at Mauritius. Eels of the genera *Muræna*, *Ophiichthys* and *Murænesox* are common but are not eaten by the natives. Numbers of black Holothuriæ, or *bêche de mer*, are found on the sand which covers the bottom of the lagoon, but these, although they are cured and eaten as trepang by the Chinese, are not used in these islands. Immense rock-lobsters are caught on the outer shores, and are excellent eating. The lagoon is infested with sharks, so that it is dangerous to bathe in deep water. A few large individuals of the formidable hammer-headed shark (*Zygæna malleus*) infest particular parts of the lagoon, but smaller examples of the common blue shark (*Carcharias glaucus*) are more common, rarely attaining a greater length than nine or ten feet within the lagoon. Larger specimens are found in the open ocean.

These coral-formations lifting themselves scarcely above the heaving waters of the ocean, and seeming to the eye all too weak to withstand the fury of the breakers which unceasingly beat against their shores, afford a remarkable sight as one approaches them from the sea. I should

strongly advise any one who has never seen a coral island, and who may be travelling to Australia, to take his passage by one of the Orient line of steamers, that he may have the chance of spending a few hours on one of these marvellous structures. If he is fortunate he will pass close by the small atoll of Six islands early in the morning, and will enter the harbour of Diego Garcia at about two o'clock on the same afternoon. On a fine day, the varied colours of the still waters of the lagoon, the low-lying strip of land, covered with vegetation of a vivid green, the dazzling strip of white sand which borders the shores, and the clear and sunny sky, will afford a picture which will not easily be forgotten. And should he have an opportunity of landing, and wandering among the palms and bushes with which the land is clothed, the most unimaginative person will not fail to be struck with wonder that the vital activity of animals so low in the scale as coral-polyps has been sufficient to raise up this island above the waves, and to maintain it there in spite of the unceasing wear and tear to which it is subjected from the restless waves of the great southern ocean.

GEOGRAPHICAL NOTES.

Extension of the System of Scientific Instruction for Intending Travellers.—The Council of the Royal Geographical Society have made arrangements for the addition of Geology, Botany, and Photography to the branches in which lessons are given under its auspices, on very moderate terms, to intending travellers. The lessons will embrace, henceforward until further notice, the following subjects:—1. Surveying and Mapping, including the fixing of positions by Astronomical Observations. By Mr. John Coles, Map Curator of the Society. 2. Geology, including practical training in the field. By Mr. W. Topley, of the Geological Survey, President of the Geologists' Association. 3. Botany. By Mr. N. E. Brown, of the Herbarium, Kew. 4. Photography. By Mr. John Thomson, Author of 'Photographic Illustrations of China and its People,' and other works. The lessons are given on days and at hours arranged between the Instructor and the pupil. The fee to pupils will be for each lesson of an hour, 2*s.* 6*d.*

The Russian Expedition to the Delta of the Lena and New Siberian Islands.—The two Russian travellers, Dr. Bunge and Baron von Toll, charged by the Russian Geographical Society with the exploration of the New Siberian Islands, have, according to the latest information (September 5th, 1885), again traversed during last autumn the country situated between the Yana and the Lena Delta (*vide* 'Proceedings R.G.S.,' March 1886, p. 189). Dr. Bunge was preparing for a visit in the spring to the New Siberian island of Kotelny, whither the impedi-

menta of the expedition will be sent on dog sledges. Besides these, some forty reindeer will be taken. Baron von Toll had studied the fauna of the littoral of the Arctic Sea, and had explored the mountains on the right bank of the Lena, where he obtained six specimens of mountain sheep (*Ovis borealis*). He had also visited a spot 180 miles from Ustyansk, where a few summers ago a Tungus discovered the skull of a mammoth still covered with its skin and hair; and he intends to make an attempt to find a complete skeleton of this extinct animal. The results hitherto obtained by the expedition are very satisfactory. Nearly the whole region of the Yana, with its mountains, was explored last year; rich palæontological collections were obtained, besides 400 kinds of plants, a large number of insects and other invertebrata and mollusca.

North-west Persia.—In June and July of last year Mr. J. D. Rees, Under Secretary to the Government of Madras, made a journey in North-west Persia, from Kasvin to Hamadan, over a stretch of little-known country west of Teheran. He describes the results briefly in 'Notes of a Journey from Kasvin to Hamadan across the Karaghan Country" (Madras, 1885), with sketch-map on the scale of 12 miles to an inch. Both the terminal towns are pretty well known, but the intervening country is scarcely at all known to Europeans. Is it known, Mr. Rees asks, that away up to the Elburz range extend fertile and well-watered plains covered with corn, and vineyards, and orchards, and hills, that, unirrigated, give a fair annual return of wheat? Mr. Rees's notes show that such is the character of the tract he traversed, while his inquiries go to show that the tract between Kom (Kum) and Hamadan much resembles it. Nor is the country south of this, about Sultanabad and Gulpaigan, less fertile, "while further south again the country of the Karun and the Tigris is reached, a part of which was, till war and rapine destroyed it, the garden of the world." Mr. Rees is of opinion that few people appreciate the full significance of the fact that the whole country west of the beaten track from sea to sea presents a marked contrast to that beaten track, to the country to the east of it, and to the coast of the Persian Gulf. Again, Mr. Rees maintains that if portions of the country are shown to be more fertile and populous than is commonly supposed, and that good reasons are shown for believing that others resemble them, it is a fair inference that the number of inhabitants of the country is proportionately underestimated. He thinks the population is more nearly ten millions than seven and a half millions, which is the latest semi-official estimate. Kasvin is about 100 miles north-west of Teheran, and about 120 north-east from Hamadan. Mr. Rees's route was somewhat of a zigzag, which considerably increased the distance traversed by him. He travelled absolutely without official aid and countenance, and associated on terms of complete equality with every one he met. Mr. Rees

gives ample details of distances, of the character and population of the villages through which he passed, the nature of the country, and the kind of supplies to be obtained. The country, as a whole, is undulating and even mountainous, the highest point passed by Mr. Rees being, about 80 miles south-west of Kasvin, 9700 feet. On the lower levels many fertile spots were met with, and in some cases luxuriant gardens. On the higher levels wild thyme grows luxuriantly, and the iris, buttercup, dandelion, bluebell, forget-me-not, mallow, and other common English flowers, grew side by side with others of a most un-English character. The whole route was dotted with villages of hardy and well-fed Turkis and Eels, and would grow far more rain-irrigated wheat if it were sown. Some of these villages have fair, some beautiful gardens, producing enough fruit for their own consumption, and for despatch to the villages in the low country; the grapes especially being transported in large quantities to Resht on the Caspian. Pasture, for the most part poor in quality, exists in sufficient quantity for an infinite number of camels and for large flocks of sheep and herds of cattle. Along the frequent streams irrigated wheat is grown. The notions of geography prevalent among the Persians met with by Mr. Rees on his route are amusing. The great country of Farangistan, where men travel hundreds of parasangs a day on the iron road, is divided into two portions, one Francistan and one Inglestan, which is either the capital of London, or of which London is the capital. Near this is the far larger country of the "Ooroos" (Russia), while in some ill-defined direction is the young world in which generally very little interest is taken. As to the politics of these countries, knowledge and speculation is confined to the English and Ooroos. The existence of two parties among the former, named "Vig" and "Toaree," is better known than might be expected, still such knowledge is confined to the local politician or the rural Khan. These parties are understood to be constantly at war with one another, while the Ooroos is more rationally governed by a Shah, who does not allow civil war. Mr. Rees states that the hills on his route seem to contain but little animal life. Of birds he saw vultures, ravens, the red-headed woodpecker, and the ubiquitous sparrow. Crabs and tortoises were common; water-snakes less so. Insects abounded of all orders, and the tarantula was frequently met with. Of land-snakes he saw none. The neighbourhood of Hamadan Mr. Rees speaks of in terms of great admiration; the town contains over 30,000 inhabitants.

Dr. Fischer's Expedition.—We are able to add some information to that given in our last issue with regard to the prospects of Dr. Fischer's relief expedition. The 'Verhandlungen' (vol. xiii. No. 4) of the Geographical Society of Berlin contains a letter from Dr. Fischer to Professor Bastian, dated 8th January, 1886, from Kagehi, on the southern shore of Lake Victoria Nyanza. The traveller had just recovered from a severe attack of fever, contracted in this unhealthy place, in which

dysentery and inflammation of the eyes are also endemic. He had found it impossible to reach Unyoro, where Emin Bey and Dr. Junker are still located, through Uganda, owing to the hostile attitude of the Kabakas, the murderers of Bishop Hannington and his party, who threaten him with a similar fate should he attempt to cross their country. He intended therefore to set out on the 10th January in an easterly direction to Kavirondo, and thence try to reach the Egyptian Equatorial provinces; making a wide detour in order to give Uganda as wide a berth as possible. He had decided to hasten his departure in consequence of an expected attack upon Kagehi by the marauding Waganda. Dr. Fischer had written to Mr. Mackay, the English missionary in Uganda, requesting him to let Dr. Junker know that he was attemping to reach him by the above-mentioned route. Dr. Fischer himself expresses his doubts as to the success of the expedition, as, among other difficulties, his stock of goods, already very much impoverished, had been selected in the first instance in view of the Uganda route, where pieces of cloth are chiefly preferred, whereas in the districts through which he has now determined to travel, copper wire and beads are most esteemed by the natives.

The Island of Jerba in the Syrtis Minor.—A recent number of the Consular Reports contains an account of Consul-General Playfair's Tour in Tunis, in October and November 1885, illustrated by three maps. It includes descriptions of the various places visited, their history, trade, European population, &c. Consul Playfair visited Tunis, Kelebia, Susa, Monastir, Mahadia, Sfax, the most important city in the Regency next to Tunis, and Gabes. From here he crossed the Syrtis Minor, or Gulf of Gabes, to the island of Jerba, a distance of 36 miles. The population of Jerba numbers 35,000 souls, 360 of whom are Europeans, and of these latter 300 are Maltese. There are no towns, properly so called, in the island, but numerous collections of houses and gardens, of which the following are the most important:—Houmt Es-Sook, the capital; Midoun and Cedrien, about 18 miles to the south-east of it; Houmt Ajim, on the south-west coast in the Western Straits, between it and the mainland; Gallala, on the south of the island, celebrated for its pottery; Cedoniksh, on the way from the capital to El-Kantara. The principal manufactures are bornouses and coloured blankets. Fish are plentiful on the coast, and a considerable trade is carried on in sponges. The most remarkable feature of Jerba is the great bight, or inland sea, which separates it from the mainland. This forms a large lake of irregular shape, the greatest length is about 10 miles, and the greatest breadth about eight miles. It communicates with the Syrtis Minor to the west by means of a narrow strait about one mile and a half broad, and with the sea to the east by a longer and broader one, the narrowest part of which is nearly two miles. Many important Roman remains exist in the island. Colonel Playfair left Jerba on the 28th of October, and returned to

the Goletta, the port of Tunis; whence he visited Porto Farina and Bizerta, thus ending the tour.

Assassination of another French Traveller in the Sahara.—Telegrams received by the Geographical Society of Paris announce the death of Lieutenant Palat while travelling in the north of the Sahara. The unfortunate traveller, who was charged by the Government of Algiers with a mission to cross the desert and reach Timbuktu, left Algiers in October 1885. After surmounting considerable difficulties, he arrived at Tuat, but was assassinated by his guides at a point about two days' march from In-Salah, in the country of the Tuaregs, not far from the spot where the ill-fated Flatters mission was massacred some three or four years ago. The hope was expressed that the French Government would now be aroused to send an expedition against the powerful and fanatical tribe of the Senussis, in order that a recurrence of these outrages may be prevented.

Identity of the Mean Sea-level at the opposite ends of the Canals of Suez and Panamá. — A few months ago General J. T. Walker* obtained the following information on this disputed subject from the engineer of the Suez Canal, through Major-General Sir John Stokes: "1. The annual mean level of the Mediterranean at Port Said, is the same as the annual mean level of the Red Sea at Suez. 2. According to the observations of the Panamá Canal Company, there is no difference of moment between the levels of the Atlantic at Colon, and of the Pacific at Panamá."

Finland.—We learn that Dr. Hult, Professor of Botany at the University of Helsingfors, is about to establish a station during the summer vacation in Finland for the study of the physical geography of the country. The spot chosen is in the vicinity of the Svartå ironworks at the south-eastern end of Lake Lojo, in Nyland, and is peculiarly favourable for the objects of the undertaking. The following are announced as the special points to which attention will be directed:—(1) The fluvial system of the country; (2) the post-glacial earth formations, as indicating the displacements of the shore-line, and as throwing light on climatic changes; (3) the stratification series in the peat-bogs; (4) the spread of wild vegetation into new districts; (5) the present state of "the colonies" of the wild-growing oak in Finland. Dr. Hult is to be congratulated on his enterprise, as it is expected that it will result in the solution of many questions of the physical geography of Finland, and also in the preparation of a good geological map of the country.

* General Walker applied for this information in consequence of the identity of levels having been questioned during the discussion which followed the reading of Major Baird's paper on the "Spirit-levelling Operations of the Great Trigonometrical Survey of India," at the Aberdeen meeting of the British Association. *Vide* 'Supplementary Papers R. G. S.,' vol. i. p. 631.

Another Expedition to Greenland.—We learn from Copenhagen that the Danish Government has decided to send out an expedition very shortly to the northern part of the west coast of Greenland, to make soundings along the coast, and to study the geology and topography of the district of Upernivik. The expedition will be under the leadership of Lieutenants C. H. Ryder and P. C. D. Bloch, of the Danish Navy.

Population of Guatemala.—According to the just issued official statistics of Guatemala, the following are the populations of the several departments on January 1st, 1886:—Guatemala, 134,325; Amatitlan, 33,559; Escuintla, 29,881; Sacatepequez, 38,593; Chimaltenango, 54,082; Salalá, 78,385; Totonicapam, 149,379; Suchitepequez, 33,767; Retalhuleu, 22,885; Quezeltenango, 96,268; San Marcoz, 80,416; Huehuetenango, 124,475; Quiché, 80,020; Baja-Verapaz, 45,949; Alta-Verapaz, 97,301; Petén, 8373; Izabal, 3728; Livingston, 1439; Zacapa, 40,401; Chiquimula, 59,055; Jalapa, 32,490; Jutrapa, 44,319; Santa Rosa, 33,454. Total, 1,322,544, showing an increase of 37,940 over the population of January 1st, 1885, or at the rate of nearly 3 per cent. per annum, a most extraordinary rate of increase; the births for 1885 are given as 63,687, and deaths as 25,747.

Indian Rock Inscriptions in the United States.—Dr. W. G. Hoffmann, of Washington, contributes to the current number of Petermann's 'Mitteilungen' a short article on his recent discoveries of native markings on rocks in various parts of the United States, which are expected to throw considerable light on the ancient geographical distribution of some of the Indian tribes and also upon their manners and customs. The writer has found among the sandstone rocks of the Missouri in Dakotah several miles west of the Santee Indian Agency, life-size figures of human beings carved from the soft stone. Some of these figures show the body pierced by a knife or arrow, while in others the hole made by a bullet is plainly visible. The Indians inhabiting the district believe the figures to be the work of the spirits of the departed. In many places, where the route is difficult to find, rocks have been found with human footprints carved upon them, which were doubtless intended to serve as geographical landmarks, as they invariably indicate the best route either to some Indian encampment or to the shallow parts of some deep stream. Among other places, these footprints have been met with on the Blue Mountains between Georgia and North Carolina, and also on the Kenawha river. Again, on the steep rocks of the Tennessee in the neighbourhood of Indian graves, the author has found carved representations of the sun, moon, and different animals, which he supposes were intended to show forth the virtues and social rank of the deceased. The further study of these rock-markings will doubtless add much to our knowledge of the old Indian tribes and their wanderings.

Growth of Population in Europe.—In the May number of 'Petermann's Mitteilungen,' Dr. Alwin Oppel has an instructive paper on the progressive increase of the population of Europe. The special geographical interest of the paper lies in the fact that Dr. Oppel shows that a distinct relation exists between the rate of increase of population, and latitude and longitude. Taking for example the figures of the censuses of the last thirty years (in the main) he found the following annual percentages of increase in the different countries:—Denmark (without the Färoes and Iceland), 1·328; Norway, 1·172; Russia, 1·063; Netherlands, 1·042; Sweden, 1·037; Great Britain and Ireland, 0·941; Germany, 0·927; Belgium, 0·802; Portugal (without its islands), 0·733; Austria-Hungary, 0·702; Switzerland, 0·636; Italy, 0·619; Luxemburg, 0·587; Spain, 0·400; France (without Savoy and Nice), 0·160—the average being 0·809. The annual average percentage of increase of Great Britain alone since the beginning of the century has been 2·285; of England and Wales, 2·400; of Scotland, 1·652; of Great Britain and Ireland in the same period, 1·444. For Ireland in the eighty years there is a decrease to record, averaging 0·929 annually. Apart from this detail it will be seen that of the fourteen regions named one-half is above and one-half below the average; and that the higher percentages belong exclusively to countries in the north and east, while the lower percentages refer only to the southern and western States. Moreover, Dr. Oppel points out none of the lower percentages reach the estimated average annual rate of increase of the whole earth. Dr. Oppel then draws the following general conclusion from this investigation:—In Europe the progressive increase of population is in the direction from north to south; and further, the smaller percentage of increase is not peculiar to people of Romanic race, but is also found among those branches of the Germanic stock that live in the south, as Swiss and Austrians, who stand on essentially the same footing as Italians and Portuguese.

New Method for Contoured Relief-Maps.—Mr. Henry Brooks, of Boston, U.S., communicates to *Science* of May 7th, a new method which he has invented for the construction of topographical models or relief-maps. His instructions are to make a careful tracing of the contour lines on waxed or oiled tracing-paper. Linen must not be used, as it will distort the lines when wetted. Paste the tracing on a clear piece of white holly veneer, an eighth of an inch in thickness, and cut, with a fine fret-saw, the lines of contour, leaving spaces (uncut, we presume) here and there, should the lines so run that the intervening wood would drop out. Fasten the veneer to a board, being sure that the surface is flat. The veneer is to be fastened "only by the edges, and not through the spaces between the contour lines." Next cut slips of thin brass, each strip being as wide as the height of each contour line, and insert the strip into the corresponding saw-cut of the veneer, pressing each down until it

touches the board below the veneer. When all the contours are in place, paint the whole surface over with heated wax; then fill in the spaces between the strips with clay, until only the edges of the strips show. Where spaces have been left the strips are cut with a slanting end long enough to span the space uncut, and the line of contour is thus unbroken. Such is Mr. Brooks' account of his method, which is by no means clear on first reading. When he says to fasten the veneer to the board by the edges only, we are not quite sure whether he means only the outside edge of the whole, or the edges of each contour cutting. Each strip of thin brass, we understand, should be of a width corresponding to the height above sea-level or other standard base, of the contour-line on the map. If, for example, the scale is 1000 feet to an inch, the contour of 5000 feet will require a width of five inches for its brass strip. The final direction seems also obscure. It refers, no doubt, to the uncut space in the veneer, left in order to keep the pieces together. In such cases the ends of the brass strip should be cut off at an angle, so that the upper edges of the strip may project over the uncut part of the veneer. No doubt by this plan a very solid and accurate relief will be formed.

REPORT OF THE EVENING MEETINGS, SESSION 1885–6.

Eleventh Meeting, 10*th May*, 1886.—General J. T. Walker, C.B., F.R.S., in the Chair.

Elections—*William James Henry Carr-Boyd, Esq.; Arthur Dick, Esq.; William Hersee Freeman, Esq.; Oliver Pegler, Esq.; Frederick C. Penfield, Esq.; William Pilcher, Esq.; Arthur Scott, Esq.; Frederick Sternberg, Esq.; Herbert Stivens Stower, Esq.; John T. Wills, Esq.; John Edward Usher, Esq., M.D.*

Announcement of the Adjudication of the Royal Medals and other Awards for the Year 1886.

The Chairman read the annual awards as made the same day by the Council, as follows:—

The Founder's Medal, to Major A. W. Greely, Commander of the United States Arctic Expedition of 1881–4; for having so considerably added to our knowledge of the shores of the Polar Sea and the interior of Grinnell Land; the first through the exploration of the late Lieut. Lockwood along the northern coast of Greenland, as far as 83° 23′ 48″ N., being the nearest to the Pole ever attained; and the second, by his own explorations into the interior of Grinnell Land, together with the journey across it to the Western Sea, by Lieut. Lockwood. Also, for his admirable narrative of the Expedition which he has just given to the world.

The Patron's or Victoria Medal to Signor Guido Cora, for his important services as a writer and cartographer in advancing geographical knowledge, pro-

moting the study of Geography, and defining its position as a science; for his well-known publication 'Cosmos,' which for twelve years has greatly aided the progress of Geography, and for his valuable map of Italy, in which the topographical and hydrographical work of his Government are embodied for the first time.

The MURCHISON GRANT for 1886, to the brothers F. and A. JARDINE, for their remarkable journey overland to the settlement of Somerset at Cape York (Queensland) in May 1864 to March 1865, during which they solved the question of the courses of the northern rivers emptying into the Gulf of Carpentaria and definitely ascertained the area of the York Peninsula adapted for pastoral occupation.

The BACK GRANT for 1886, to Sergeant DAVID L. BRAINARD, in recognition of the effective services rendered by him during the various explorations carried out by the American Arctic Expedition of 1881–4.

The Honorary Corresponding Members elected were—Dr. Hermann Wagner, Professor of Geography at Göttingen; Professor J. Du Fief, Gen. Secretary of the Belgian Geographical Society; Colonel Venukoff, formerly Secretary of the Geographical Society of St. Petersburg.

The following paper was read:—

"Roman roads and English railways in Anatolia." By Professor W. M. Ramsay.

Will be published in a subsequent number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—2nd April, 1886: M. A. GERMAIN in the Chair.—M. Hangsen-Blangsted called the attention of the Society to a paper read before a recent meeting of the Geographical Society of Copenhagen by Lieutenant Lauridsen, on the present position of the German and Danish languages in South Jutland. He calculated that in four generations the Danish language would disappear from that part of the country. This had been the case in the peninsula of Angeln, and whereas Danish was dominant in 1786, a German patois neither elegant nor rich in expression was now chiefly spoken. The west coast was the scene of the most violent struggle between the two languages.—The following information was received from M. M. Venukoff regarding the geographical movement in Russia. M. Krasnoff, the botanist, before starting on his expedition to the Tian Shan, had published an important memoir on the relations between the chemical composition of the soil and the character of the flora of a country. This work would throw valuable light on botanical geography. The latest news (21st October, 1885) received from M. Potanin stated that M. Scassy was travelling from Sunghan-Tin to Lang-Chu making topographical surveys and astronomical observations. M. Potanin and M. Scassy intended to pass the winter at Sinning. As the return of M. Beresovsky to the latter place was not expected until the 1st March last, the three travellers could not start for Russia before about the 15th March. The cost of the expedition had already reached 27,000 roubles. M. Belavsky had reported the result of his investigations as to navigation between Petro-Alexandrovsk and Chardjui, and it was thought that regular communication by steamers would soon be opened along the Oxus as far as Chardjui. The Persian Government had constructed a good caravan road between Meshed and Askhabad in order to facilitate the trade of Korassan with the ports on the Caspian Sea.—M. R. du Caillaud sent three communications as follows: (1) on the name of Sheikh-Said; (2) on the

designation of Camoens Point; (3) as to the desirability of arming the Annamite Christians.—It was announced that M. Aymonier had been appointed Vice-Resident at Binh-Thuân, where he would doubtless continue his valuable researches on the native races.—Captain Plée announced by a telegram, dated 29th March, the assassination of Lieutenant Palat in the Sahara.—M. Venukoff informed the Society of the publication by Baron Kaulbars, Russian military agent at Vienna, of an excellent map of South America on the scale 1 : 6,300,000. The map was in eight sheets and had taken the author nine years to complete. Baron Kaulbars was now engaged in preparing a map of Africa on the same scale.—M. René Allain called attention to the possessions of England in North Borneo, which he said were not shown on many French maps; he was of opinion that France might profit by this recent example of the colonial expansion of England.—M. Hangsen-Blangsted announced that Lieutenants C. H. Ryder and P. C. D. Bloch of the Danish Navy were about to start for North Greenland for the purpose of making soundings and excursions in the district of Upernivik.—M. Jackson, the librarian of the Society, stated that an important collection of maps, mostly ancient, had just been presented to the Society by M. G. de Villers, son-in-law of the late learned archæologist M. Adrien de Longpérier, of whose library the maps formed part.—M. Virlet d'Aoust made a communication regarding the district of Avesnes (Department du Nord), its agriculture and industries.—In conclusion, Comte de Charency read a paper on the State and City of Xibalba (Mexico).

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Baedeker, K.—Italy. Handbook for Travellers. First Part: Northern Italy, including Leghorn, Florence, Ravenna, the Island of Corsica, and Routes through France, Switzerland, and Austria. With 16 maps and 29 plans. Seventh remodelled edition. Leipsic, Karl Baedeker; London, Dulau & Co., 1886: 12mo., pp. lxii. and 502. Price 6*s*. [Presented by Messrs. Dulau & Co.]

[Iceland.]—Islands Natur und ihre Einflüsse auf die Bevölkerung. Von Dr. Konrad Keilhack in Berlin. Mit zwei Karten und zwei Lichtdruckbilden. In 'Deutsche Geographische Blätter,' Heft 1, Band ix., pp. 1–30. Bremen, 1886.

This is an instructive study in what the Germans call Anthropogeography. The map is on the scale of 1 : 1,920,000, and shows the inhabited districts.

Schliemann, [Dr.] Henry.—Tiryns. The Prehistoric Palace of the Kings of Tiryns. The results of the latest excavations. The preface by Professor F. Adler, and contributions by Dr. Wm. Dörpfeld. With 188 woodcuts, 24 plates in chromolithography, one map, and four plans. London, John Murray, 1886: cr. 4to., pp. lxiv. and 385. Price 42*s*.

Topley, William.—The National Geological Surveys of Europe. London, Trübner & Co., 1885: 8vo., pp. 20.

——— Report of the Committee on the Erosion of the Sea-coasts of England and Wales. London, Spottiswoode & Co., 1886: 8vo., pp. 65, map.

Walker, Walter Frederick.—The Azores, or Western Islands. A Political, Commercial, and Geographical Account. Maps and illustrations. London, Trübner

& Co., 1886: 8vo., pp. viii. and 335. Price 10*s.* 6*d.* [Presented by the Publishers.]

So little is written about the Azores, that any trustworthy information from a recent visitor is welcome. Mr. Walker has not taken much pains to arrange his information, and he sometimes occupies space with what is of trifling value. Still, both to the geographer and the intending visitor the book will prove useful. It refers specially to the eastern group of islands—St. Michael and St. Mary, the Formigas and Dollabaret Rocks. Mr. Walker, in a few introductory chapters, refers to early voyages to the Azores; then in a somewhat irregular way deals with the several islands, their physical characteristics and peculiarities; their towns; the people, their character and customs; the industries and commerce of the islands; climate, and many other points. He draws both from his own observations and from the works of previous writers. There is a small map of the group and a good map of St. Michael's, reduced from Captain Vidal's survey, besides a number of illustrations and the music of several island melodies.

ASIA.

Isvestiya Kavkazkago otdiela Imperatorskago Russkago geographicheskago obschestva. (Proceedings of the Caucasus Branch of the Imperial Russian Geographical Society.) Vol. viii., Tiflis, 1884–1885.

This volume contains the translation of a letter from Colonel Stebnitsky to M. Faye, member of the French Academy of Sciences (published in the 'Comptes rendus hebdom. des Séances de l'Académie des Sciences,' t. xcvii. No. 8, 20th August, 1883), on the figure of the earth, showing the results of geodetic measurements in Southern Russia and on either side of the chain of the Caucasus. The result of these observations is that north of the main chain of the Caucasus for a distance of 200 miles to its foot at Vladikavkaz, the deflection of the plumb-line continually increases and is fully explained by the attraction of the mountain mass. On the southern side of this range, the deflection is less, but acts in an opposite direction, i. e. towards the north. In his supplementary remarks Stebnitsky adduces evidence in disproof of M. Faye's theory on the distribution of gravity on continents and at the bottom of the sea.

The next article in this number is on the naphtha hill, by F. von Koshkul. This hill is situate about 75 versts (50 miles) east of the island of Cheleken in the Caspian, and about 20 miles west of the railroad station of Bala Ishem. There appears to be the same co-relation between the direction of the upheaval of the naphtha hill and Buya-tagh, the lesser Balkhan and Kurren-tagh, as between the mud volcanoes on the west shore of the Caspian, situated between the peninsula of Apsheron and the mouth of the Kur, and the islands Duvani, Bulla, Glinianoi (mud), Los, Svinoi, Oblivnoi and Pogoreloia Plita. The volcanic force has been exerted in the same directions as the greatest upheaval of the earth's crust in the south-eastern part of the main chain of the Caucasus, i. e. from north-west to south-east and from north-east to south-west. The island of Kumani, which appeared in May 1563, and subsequently vanished, occupied a position exactly at the point of intersection of these two lines of upheaval.

The importance of the naphtha hill, of which an ideal profile is given, is considered by the author with reference to the trans-Caspian railroad now in course of construction, and supplies of fuel.

The next article is a short sketch of the population of the Kuban region to illustrate a map of this country on the scale of 20 versts to the inch, given in the volume. This is followed by some observations by P. Kuhlberg on the determination of the longitudes of Tiflis, Shemakha, and Baku by telegraph, and the new latitudes fixed for these positions. This work in continuation of that begun in 1873 by the Military Topographical Department of the Staff Corps for European Russia and Siberia, was executed in 1882 under the direction of Major-Gen. Stebnitsky by Gladishef and Kuhlberg, and the following year the network of telegraphically determined longitudes was extended to Baku and Shemakha. The mean of the observations gave a difference in longitude in

time between Baku (minaret of the Khan's palace) and Tiflis (small tower observatory) of 0h. 20m. 10s.·511 or 5° 2′ 37″·66, resulting in a difference of − 2″·59 as compared with the longitude of Baku ascertained by trigonometrical survey in 1847. The results of the observations for the other positions are also given, that of Baku, however, is the most important, as it will serve as the basis of the future astronomical survey of Krasnovodsk and the trans-Caspian region.

There is a note on observations on the swing of the pendulum at Shemakha and Baku by Kuhlberg, the report of the Caucasus section of the Russian Geographical Society, literary notes, reviews and chronicle; tables of triangulations in the trans-Caspian region by Pervas in 1881 and 1882; astronomical positions fixed in the Khanats of Khiva and Bokhara by Gedeonof in 1884; heights determined barometrically in Asiatic Turkey by Kusikof in 1884. There is also a note by Kuhlberg on the difference in longitude between Batum and Nikolaief, fixed by telegraph. The works of Felitsky on the mountaineers of the Kuban are reviewed by Zagursky. This is followed by a sketch of the north-western border of Afghanistan by the same author. The volume concludes with a supplement containing (1) Toros Akhbar, guide through Armenia. Notes of travel by the archimandrite Garegin Srvandztiants, translated by Kishmishef; (2) corrections to the list of inhabited places in the Erzerum region; (3) extracts from the Salnameh of the vilayet of Erzerum for the year 1299; (4) Historico-ethnographical notes on the Syro-Chaldees; and (5) Notes on the physical and historical geography of Asia Minor by Colonel Charles Wilson, translated by F. V. Yachefsky.—**[E. D. M.]**

Vitus J. Bering og de Russiske opdagelsesreiser fra 1725–43 af P. Lauridsen. Copenhagen (Gyldendalske Boghandels Forlag; F. Hegel & Son): 1885, small 8vo., pp. 2 and 210, charts and woodcuts.

Following up his excellent little book on Jens Munk's Navigatio Septentrionalis, noticed in the 'Proceedings' for November 1883, Herr Lauridsen has now compiled, chiefly from Russian sources, an authoritative account of the various Arctic expeditions between 1725–43, which were either commanded by Bering in person, or were initiated and organised by him, and to a certain extent carried out under his control. The work has necessitated much laborious research; and while the author has added to the reputation of his countryman by bringing a number of historical documents and new facts to light, he has earned the gratitude of geographers by clearing up several points which G. F. Müller and others left in doubt, and by tracing the source of the misconceptions which were partly exposed by Von Baer. The appendix contains an interesting report from Bering to the Russian Admiralty, dated Okotsk, 5th December, 1737, in which he details the progress of "The Great Northern Expedition," besides voluminous notes and references. The charts are as follows:—I. Bering's chart of his first voyage, with Berch's and Müller's charts of the Bering Peninsula. II. Spangberg's chart of the Kuril Islands and North Japan. III. Bering's and Chirikof's voyage to America in 1741, with Lütke's chart of Bering's Sea. IV. Kajak or Set Elias Island, from Chitrof's journal. There are also a reproduction of a quaint sketch of Okotsk in 1737, and an engraving of the Bering obelisk in Petropaulovsk.—**[G. T. T.]**

Yule, Col. H., and Burnell, A. C.—Hobson-Jobson: being a glossary of Anglo-Indian colloquial words and phrases and of kindred terms; etymological, historical, geographical, and discursive. By Colonel Henry Yule, R.E., C.B., LL.D., and the late Arthur Coke Burnell, PH.D., C.I.E. London, 1886: pp. 870, with portrait of Arthur Burnell. Price 36*s*.

Colonel Yule explains in a preface the alternative title he has given to his book. "Hobson-Jobson" is a typical example of those expressions which have been assimilated into the Anglo-Indian vernacular. A full explanation of the phrase will be found in the glossary. "It is in fact an Anglo-Saxon version of the wailings of the Mahommadans as they beat their breasts in the processions of the Moharrem, 'Ya Hassan! Ya Hosain!'"

The plan of this work is to give an explanatory paragraph to each word,

followed by quotations in smaller type from various authors arranged chronologically, so that the reader may trace the origin and evolution of any particular phrase or word. The glossary will doubtless be of great use to Anglo-Indians and to all readers interested in Oriental studies.

In the work there are many words of special geographical interest. To take a few familiar instances:—We learn from it that Point de Galle derives its name from the crest of a cock (*gallo*) given to the town by the Portuguese; that Guardafui was not so called from the French *Gardez-vous*, "take heed," as alleged, but is a corruption from the Arabic *Jard-Hafūn*, pronounced by Egyptians *Gard-Hafūn*; that Japan is a modernised form of *Chipan-gu*, or *Jipan-ku*, as this country was known to mediæval travellers, and that this name represented the Chinese *Lhi-pan-kwe* ("Sun-origin-kingdom") the kingdom of the sunrise, or extreme Orient. Mandalay, the capital of the King of Burmah, takes its name from a conical isolated hill rising high above the Irawadi. The name of the hill (and now of the city at its base) probably represents *Mandara*, the sacred mountain which in Hindu mythology served the gods as a churning staff at the churning of the sea. It would be easy to multiply instances of geographical names treated of in this fascinating volume.—[**E. D. M.**]

AFRICA.

[Basutoland.]—Short History of Basutoland. Compiled chiefly from Blue-books. Prepared in the Intelligence Branch, War Office, by Captain L. Darwin, R.E. March 1886. Pp. 14. Outline map on scale of 40 miles = 1 inch.

[Cameroons.]—Eine Reise in das Gebiet nördlich von Kamerungebirge. I. Von G. Valdau. Mit Karte. 'Deutsche Geographische Blätter,' Heft 1, Band ix., pp. 30–49.

In the end of 1883 two young Swedes, Georg Valdau and Knut Knutson, went out to the Cameroons, and fixed their station at Mann's Spring, on the face of the mountain, about 7000 feet above sea-level. They soon got on good terms with the natives, and were of much use to the Germans in effecting the annexation of the regions. They made frequent incursions in various directions; and it is one of these, into the region north of the Cameroons, which is here described in the first part of a paper by Herr Valdau.

Coffinières de Nordeck [Lieut.]—Voyages aux Pays des Bogos et du Rio-Nuñez [West Africa], 1884–1885. Texte et dessins inédits. In 'Le Tour du Monde,' No. 1321 et seq.

[Madagascar].—French Operations in Madagascar. 1882–1886. Prepared in the Intelligence Branch, War Office, by Major W. S. Cooke, February 1886. London, Harrison & Sons, 1886: folio, pp. 44, map. [Presented by the Intelligence Branch, War Office.]

Moffat, John S.—The Lives of Robert and Mary Moffat. With portrait and maps. Third edition. London, Fisher Unwin, 1885: 8vo., pp. xix. and 484. Price 18*s*. (Presented by the publishers.)

This is a well-written and instructive life of two important pioneers of geographical research as well as missionary work in Africa. Moffat had no doubt much to do with the inspiration of Livingstone, and the ultimate direction which the work of the great explorer took. When Moffat settled in Kuruman in the early part of the century, but little was known of that region, which he helped to unveil. Although his direct contributions to a knowledge of the geography of Africa were few, still the accounts of his labours which he sent home at intervals, and which were gathered up in his book on his missionary work in South Africa, helped to fill up our scanty knowledge of these regions and served as a stimulus to further exploration. The results of Moffat's labours as a missionary are admitted to have been of a solid and unusually permanent character. Mrs. Moffat was a woman of a remarkably original character, and

was a real helpmate to her husband. There are two portraits of Robert and Mary Moffat, in their youth and in their old age, illustrations of Moffat's birthplace and of Kuruman, and two small maps—one of South Africa in 1820, and another of the same region in 1885.

[Pondoland.]—Précis of Information concerning Pondoland, including Port St. John's. Prepared in the Intelligence Branch, War Office. Corrected to February 1886. London, Harrison & Sons, 1886: 8vo., pp. 19, map. [Presented by the Intelligence Branch, War Office.].

AMERICA.

Albarracin, Santiago J.—Estudios generales sobre los rios Negro, Limay y Collon-Curá y lago de Nahüel Huapí. Con numerosas vistas de los parajes recorridos, desde la barra del Rio Negro, hasta el límite occidental del lago de Nahüel-Huapí y una carta general de los rios explorados. Tomo I. Buenos Aires, Imprenta de Juan A. Alsina, 1886: oblong 8vo., pp. vii. and 160. [Presented by the Author.]

Albornoz, [Dr. Don] Mariano Martin.—Breves apuntes sobre las Regiones Amazónicas. Lima, Imprenta de "El Progreso," 1885: 8vo., map, pp. 51. [Presented by the Author.]

[America, United States.]—Department of the Interior, United States Geological Survey. J. W. Powell, Director. Mineral Resources of the United States. Calendar years 1883 and 1884. Albert Williams, jr. Washington, Government Printing Office, 1885: 8vo., pp. xiv. and 1016. [Presented by the Director of the U.S. Geological Survey.]

——— Department of the Interior. United States Geological Survey, J. W. Powell, Director. Bulletin of the United States Geological Survey, Nos. 15–23. Washington, Government Printing Office, 1885: 8vo., maps and plates. [Presented by the Director of the U.S. Geological Survey.]

No. 15. On the Mesozoic and Cenozoic Paleontology of California. By Charles A. White, M.D. No. 16. On the Higher Devonian Faunas of Ontario County, New York. By John M. Clarke. No. 17. On the Development of Crystallization in the Igneous Rocks of Washoe, Nevada, with Notes on the Geology of the District. By Arnold Hague and Joseph P. Iddings. No. 18. On Marine Eocene, Fresh-water Miocene, and other Fossil Mollusca of Western North America. By Charles A. White, M.D. No. 19. Notes on the Stratigraphy of California. By George F. Becker. No. 20. Contributions to the Mineralogy of the Rocky Mountains. By Whitman Cross and W. F. Hillebrand. No. 21. The Lignites of the Great Sioux Reservation; a Report on the Region between the Grand and Moreau Regions, Dakota. By Bailey Willis. No. 22. On New Cretaceous Fossils from California. By Charles A. White, M.D. No. 23. Observations on the Junction between the Eastern Sandstone and the Keweenaw Series on Keweenaw Point, Lake Superior. By R. D. Irving and T. C. Chamberlin.

[Buenos Ayres.]—Ministère de Gouvernement, Bureau de Statistique Générale. Annuaire Statistique de la Province de Buénos-Ayres, publié sous la direction du Docteur Emile R. Coni. Quatrième Année—1884. Buénos-Ayres, Typographie et fonderie de la República, 1885: large 8vo., pp. xli. and 484, maps and plans.

Canada, Geological and Natural History Survey of. Alfred R. C. Selwyn, LL.D., &c., Director. Contributions to Canadian Palæontology. Volume I. By J. F. Whiteaves, F.G.S., &c. Part I.—Report on the Invertebrata of the Laramie and Cretaceous Rocks of the Vicinity of the Bow and Belly Rivers and adjacent localities in the North-West Territory. Montreal, Dawson Brothers, 1885: large 8vo., pp. 89, plates. [Presented by the Geological and Natural History Survey of Canada.]

Coni, [Dr.] Emilio R.—Ministerio de Gobierno, Oficina de Estadística General. Reseña Estadística y Descriptiva de La Plata, capital de la Provincia de Buenos Aires. 19 de Noviembre de 1885. Buenos Aires, 1885: large 8vo., plans and plates, pp. xvi. and 192. [Presented by Dr. Emilio R. Coni.]

Florida, Orange County, Zellwood. Philadelphia, T. Ellwood Zell; Zellwood, Florida, R. G. Robinson, 1885: 12mo., maps and illustrations, pp. 16. [Presented by Mr. T. Ellwood Zell.]

[Gancedo, Alejandro.]—Memoria descriptiva de la Provincia de Santiago del Estero. Buenos Aires, Stiller and Laass, 1885: large 8vo., pp. 387, 4, maps, plans, and plates.

Leclerq, Jules.—La Terre des Merveilles; Promenade au Parc National de l'Amérique du Nord. Paris, Hachette et Cie., 1886: 8vo., pp. 384. Price 4 fr.

This is an interesting account of a recent visit made by M. Leclerq to the Yellowstone Park, supplemented by information on this strange region, derived from various sources. There are many illustrations, and two maps, one showing M. Leclerq's route westwards, and another of the Park itself. Appended is a useful bibliography of works and papers on the Park.

[Mexico].—Nombres Geográficos de Mexico. Catalogo Alfabetico de los Nombres de Lugar perteneciente al idioma "Nahuati." Estudo Jeroglifico de la Matriculo de los Tribritos del Codice Mendocino. Por el Dr. Antonio Peñafiel, encorgado de la Direccion General de Estadistica de la República Mexicana. Dibujos de las "Antiguedades Mexicanas" de Lord Kingsborough, por Sr. Domingo Carral y grabados por el Sr. Antonio H. Galaviz. With separate atlas. Mexico: Oficina Tip. de la Secretaria de Fomento, 1885: 4to., pp. 260 and [4]. [Presented by the Mexican Government.]

The accompanying atlas contains 39 plates, each with 12 coloured hieroglyphic figures.

Panton, J. Hoyes.—The Historical and Scientific Society of Manitoba. Transactions No. 20. Season 1886. Notes on the Geology of some Islands in Lake Winnipeg. A paper read before the Society on the evening of Thursday, January 28, 1886. Winnipeg, Manitoba Free Press, 1886: 8vo., pp. 10.

Strachan, Richard.—Results of Meteorological Observations made at Asuncion, Paraguay. 1885: 8vo.

PACIFIC.

[Hawaii.]—The Honolulu Almanac and Directory 1886. Containing Complete Statistical and General Information relating to the Hawaiian Islands. Third year of publication. Honolulu.

Romilly, Hugh Hastings.—The Western Pacific and New Guinea. Notes on the Natives, Christian and Cannibal, with some account of the Labour Trade. London, Murray, 1886: 8vo., pp. vi. and 242. Price 7*s.* 6*d.*

Mr. Romilly is Deputy Commissioner for the Western Pacific, and Acting Special Commissioner for New Guinea. As such he had exceptional opportunities of visiting many out-of-the-way groups, and becoming intimately acquainted with the people and their internal life. He possesses a special faculty for winning the confidence of natives as well as of white adventurers, and as he is steeped in humour (of a refined Mark Twain type) his little book will take rank as one of the most interesting stories of travel of recent times. The principal groups dealt with by Mr. Romilly are New Britain, New Ireland, the Solomons, the Admiralties, the Hermits, the Woodlarks, the Laughlans, Tobriands, and Louisiades, many of them but little known and rarely heard of; also Tonga Islands, Rotumah (before annexation to Fiji), Wallis Islands, Norfolk and

Thursday Islands, New Guinea (Astrolabe Bay and the south-east coast). Mr. Romilly's notes on the geography and natural history of some of the less-known groups are welcome. His interest, however, is mainly in the people themselves, and what he has to tell about them will interest both the ethnologist and the general reader. He has a chapter on poisoned arrows, in which he adduces many reasons for disbelieving in the potency of so-called arrow poison. There are other chapters on the Old Labour Trade and White Men in the Pacific, containing some strange revelations. Mr. Romilly's description of a cannibal feast in New Ireland, at which he was present, is no doubt horrible enough, but is valuable as a trustworthy testimony to the existence of cannibalism in these islands. The map is a very small one.

AUSTRALASIA.

Stone's Dunedin and Invercargill Commercial, Municipal, and General Directory, Otago and Southland Gazetteer, Almanac and Companion, for 1886. Third year of publication. Dunedin, New Zealand, John Stone; London, Crosby Lockwood & Co.: small 8vo., pp. xxvi. and 448, maps. Price 7*s.* 6*d.* [Presented by John Stone, Esq.]

GENERAL.

Encyclopædia Britannica.—A Dictionary of Arts, Sciences, and General Literature. Ninth edition, vol. xx. Edinburgh, A. and C. Black, 1886: 4to., pp. 862. Price 30*s.* [Presented by the publishers.]

This new volume of the Britannica extends from Prudentius to Rostoff. The leading geographical articles are—Prussia, by J. F. Muirhead; Pskoff, by M. Krapotkine; Punjab, by General R. Maclagan; Pyrenees, by G. G. Chisholm; Quebec, by George Stewart; Queensland, by James Bonwick; Rajputana, by W. T. Ronson; Red Sea, by H. R. Mill; Rhine, by J. F. Muirhead; Reunion and Rio de Janeiro, by H. A. Webster; Rhode Island, by W. E. Forster; Rome (topography and archæology), by H. Middleton. Other articles of geographical interest are—Ptolemy, by Prof. G. J. Allman and E. H. Bunbury; Pytheas and Rhodes, by E. H. Bunbury; Raleigh, by S. Rawson Gardiner; Rennell, by Colonel Yule. There are maps to the articles Prussia, Quebec, Queensland, Rhode Island, Rome.

Hübner [Baron von].—Through the British Empire. Two vols., 8vo. Vol. i., pp. xiv. and 462. Vol. ii., pp. viii. and 515. London, Murray, 1886. Price 24*s.*

Baron Hübner's run through the British Empire was made in 1883–4, and lasted more than a year; Mr. Froude's visit was made in the first six months of 1885. Baron Hübner included India, the Malay Archipelago, Fiji, Honolulu, and Canada, &c., in his programme; these were excluded from that of Mr. Froude. For the rest they visited very nearly the same colonies. Baron Hübner spent considerable time in South Africa; did New Zealand leisurely; saw a good deal of Victoria, New South Wales, and Queensland; and was especially delighted with India and Fiji. His work is marked by the Baron's well-known geniality and vigour. It is of value as giving the views of an intelligent and fair-minded foreigner as to the present condition and probable future of the British Colonies. The work, as a whole, may be regarded as a series of skilful vignettes of various aspects of life and scenery in India and the Colonies. There is a small map of Australia and the Western Pacific.

Merriman, C. C.—Lectures, Essays, and Published Articles on Scientific and Literary Subjects and on Foreign Travel. Rochester, N.Y., Judson J. Withall, 1885: 8vo., pp. xx. and 345. [Presented by the author.]

A collection of the author's writings, comprising discussions on various subjects, among which may be mentioned the Polar Glaciers, Diversity of Races,

the Huns of Attila. There is also an account of the author's microscopical investigations at Bermuda and Florida; of his visit to Mexico in the winter of 1875–6; and also of his travels in New Zealand. The volume is illustrated with 20 photographs, including a portrait of the author.

Meteorologicheskoye Sbornik.—Meteorological record published by the Imperial Academy of Sciences, and edited by Dr. Heinrich Wild. Vol. ix. with 4 tables and 13 maps. St. Petersburg, 1885. Letterpress in English and German.

The contents of this volume are:—

1. Magnetic observations on the Caspian Sea in the summer of 1881, by M. Rykachoff. Pp. 51.

2. Annual temperature anomalies in European cyclones. By P. Braunoff. Pp. 19.

3. On the trustworthiness of the hair hygrometer at meteorological stations in Russia. By R. Bergmann. Pp. 30.

4. Results of determinations of horizontal magnetic intensity, from the observations of Ivan Nikolaievitch Smirnoff, taken in European Russia in the years 1872–1878. By A. Tillo. Pp. 54.

5. On the geographical distribution and secular change of terrestrial magnetic force in European Russia. With three maps. Pp. 78. By A. Tillo.

6. New magnetic maps of the Caspian Sea. With three maps. Pp. 56. By M. Rykachoff.

7. The distribution of winds on the shores of the Black and Azoff seas. With 6 maps. Pp. 56. By J. Spindler.

8. On small irregular fluctuations of the barometer (with table). Pp. 10. By A. Schönrock.

9. Influence of the qualities and accessories of the rain-gauge on the results obtained by it. By H. Wild. Pp. 23.

10. Annual report of the Central Physical Observatory for the years 1883 and 1884. By H. Wild. Pp. 114.

The lesser articles are:—I. Investigations on horizontal intensity of terrestrial magnetism in the environs of Pavlofsk Observatory (with a map). By E. Leyst. II. Barometrical determination of the absolute height of Lake Onega. By B. Tresnefsky. III. Barometrical determination of the height of Lake Ladoga. By L. Bergmann. IV. Remarks on barometrically determined heights of Lakes Onega and Ladoga, by H. Wild; and lastly, V. Verification of the Robinson anemometer in great velocities.

It is worth remarking that the difference between the barometrical measurements of the mean levels above the sea of Lakes Ladoga and Onega and those obtained by geodetic observations is considerable, amounting to 17 metres (55·76 feet) in each case. Thus Lake Ladoga, according to geodetic measurement, was found to be 22 metres (72·16 feet) above the sea, but by barometrical, only 7 (22·96 feet). Lake Onega, by geodetic measurement, is 43 metres (141·04 feet); by barometrical, only 26 metres (85·28 feet).

Observations made at the Magnetical and Meteorological Observatory at Batavia. Vol. vi. (in two parts). Batavia, Government Printing Office, 1885: folio. [Presented by the Magnetical and Meteorological Observatory, Batavia.]

[Portuguese Colonies.]—Subsidios para a Historia do Jornalismo nas Provincias Ultramarinas Portuguezas. Pelo Socio Brito Aranha. Lisboa, Imprensa Nacional, 1885: 8vo., pp. 27.

This is a list of journals which have at various times been published in the foreign possessions of Portugal, intended to illustrate the development of journalism in these colonies. It is issued by the Lisbon Geographical Society.

Report of the Meteorological Council to the Royal Society for the Year ending 31st of March, 1885. London, Eyre and Spottiswoode, 1886: 8vo., maps, pp. 130. Price 4*s.* 4*d.* [Presented by the Meteorological Office.]

Richthofen, Ferdinand [Freiherr von].—Führer für Forschungsreisende. Anleitung zu Beobachtungen über Gegenstände der Physischen Geographie und Geologie. Berlin, Robert Oppenheim, 1886: 8vo., pp. xii. and 745. [Presented by the Publishers.]

This is an expansion of the paper contributed by Baron Von Richthofen to Neumeyer's 'Anleitung zu Wissenschaftlicher Beobachtungen auf Reisen' (1874). The expansion occupies about ten times the space of the original article. As will be seen from the title, the work deals entirely with physical geography and geology, on both of which subjects Baron von Richthofen is specially qualified to write. He is an accomplished geologist, and both in Western America and in China has had ample practical experience as a scientific explorer. A brief summary of the ground covered by the work will show how well adapted it is as a directory for any traveller who has already a fair, or at least elementary, knowledge of geology. The object of the work, he tells us, is to indicate such observations as seem adapted to lead to an adequate morphological conception of the earth's surface. In the introductory section the author deals with preparation and methods, indicating several works, German and foreign, which the intending traveller would do well to study. This is followed by chapters on measuring and drawing, and on meteorological and biological observations. In the second part of the work observations on external conditions are dealt with, such as the various changes to which the surface is subjected; surface-water and springs; the mechanical work done by running water; ice and glaciers; continental standing water; observations on sea-coasts; islands and ocean-bed; mechanical action of atmospheric currents on the land. The third part deals with observations on soil, on rocks, and on mountain structure; containing chapters on various kinds of soft soils; on rocks; on volcanoes and eruptive rocks; on mountain building; on the chief forms of surface physiognomy; and a final chapter on useful minerals.

Spratt, [Vice-Admiral] T. A. B.—Remarks on the Dorian Peninsula and Gulf, with Notes on the Temple of Latona there. Westminster, printed by Nichols & Sons, 1886: 4to., map, pp. 21.

The following works have also been added to the Library:—

[America, United States.]—Annual Report of the Chief Signal Officer of the Army to the Secretary of War for the year 1884. Washington, Government Printing Office, 1884: 8vo., pp. 719, maps and diagrams.

Bushell, S. W.—Ancient Roman Coins from Shansi. (Extract from the Journal of the Peking Oriental Society.) Peking, Pei-t'ang Press, 1886: 8vo, pp. 11. [Presented by the author.]

Bove, Giacomo.—Expedicion Austral Argentina. Informes preliminares presentados a S.S.E.E. los Ministros del Interior y de Guerra y Marina de la República Argentina por Giacomo Bove, jefe de la Comision Cientifica de la Expedicion, y publicados bajo la direccion del Instituto Geografico Argentino, precedidos de una Introduccion y de otros documentos relativos a la Expedicion Austral Argentina. Buenos Aires, Imp. del Departamento Nacional de Agricultura, 1883: 8vo., pp. xxvi. and 217, maps and plates.

Carrasco, Gabriel.—Datos Estadísticos de la Provincia de Santa-Fé (República Argentina) sobre Poblacion nacional, extranjera y urbana—Correos—Aduanas—Telegrafos—Importacion—Exportacion—Renta nacional y provincial—Instruccion publica—Nacimientos—Matrimonios—Defunciones—Archivos—Bibliotecas—Movimiento maritimo y judicial—Guardia nacional—Inmigracion—Periodismo &c. hasta 1881. Rosario, Imprenta de E. Carrasco, 1881: 8vo., pp. 121, plan.

——— Descripcion geografica y estadistica de la Provincia de Santa-Fé escrita para la Exposicion Continental de Buenos Aires. Rosario, Imprenta de Carrasco, 1882: pp. vii. and 390, plan and plates.

Castillo, Antonio del, and Bárcena, Mariano.—Antropología Mexicana. El Hombre del Peñon. Noticia sobre el hallazgo de un Hombre prehistórico en el Valle de México. México, Tip. de la Secretaría de Fomento, 1885: 8vo., pp. 20, 3 plates.

Falkner, Thomas.—A Description of Patagonia and the Adjoining Parts of South America: containing an Account of the Soil, Produce, Animals, Vales, Mountains, Rivers, Lakes, &c., of those Countries; the Religion, Government, Policy, Customs, Dress, Arms, and Language of the Indian Inhabitants, and some Particulars relating to Falkland's Islands. By Thomas Falkner, who resided near Forty Years in those Parts. Illustrated with a New Map of the Southern Parts of America. Hereford, printed by C. Pugh, 1774: 4to., pp. iv. and 144. [Presented by C. W. Parish, Esq.]

Løffler, [Prof. Dr.] E.—The Vineland-Excursions of the Ancient Scandinavians. Copenhagen, printed by Thiele, 1884: 8vo. [Presented by the Author.]

Martel, E. A.—Le Cañon du Tarn. Paris, Typ. G. Chamerot, 1884: 8vo., pp. 22, illustrations.

——— Le Causse Noir et Montpellier-le-Vieux. Paris, Typ. G. Chamerot, 1885: 8vo., pp. 31, illustrations.

——— Promenades et Recherches dans les Cévennes. Mende, Imp. Typ. Privat, 1886: 8vo., pp. 37, plan.

[The above three pamphlets were presented by the Author.]

Moyano, Carlos M.—A traves de la Patagonia. Informe del Viaje y Exploracion desde Santa Cruz al Chubut presentado por el Capitan de la Armada D. Carlos M. Moyano al Sr. Ministro de Guerra y Marina Doctor Don Benjamin Victorica. Publicacion Oficial. Buenos Aires, Imprenta de La Tribuna Nacional, 1881: 8vo., pp. 48.

Reyer, E.—Zwei Profile durch die Sierra Nevada. 8vo., plate. [Presented by the author.]

Thordén, K. M.—De telegrafiska undervattensledningarna. Stockholm, Kongl. Boktryckeriet, 1885: large 8vo., pp. 26. [Presented by the author.]

[Tucuman.]—Memoria Histórica y Descriptiva de la Provincia de Tucuman. Buenos Aires, M. Biedma, 1882: sm. folio, pp. v. and 751, plates.

Romanovski, M.—Notes on the Central Asiatic Question. Calcutta, Office of Superintendent of Government Printing, 1870: 8vo., pp. xiv., 63, and cxxiii.

Muraviev's Journey to Khiva through the Turcoman country, 1819–20. Translated from the Russian (1824) by Philipp Strahl, PH. Doc., &c., Bonn; and from the German (1871) by Captain W. S. A. Lockhart, F.R.G.S. Calcutta, printed at the Foreign Department Press, 1871: 8vo., pp. iii. and 173. Map.

[Asia, Central.]—Russia's Commercial Mission in Central Asia. [A translation of a pamphlet on that subject, by Christian von Sarauw, Captain in the Danish Army; Leipzig, 1871]. Simla, Government Central Press, 1872: 8vo., pp. 24.

Bellew [Dr.] H. W.—The History of Káshgharia. Calcutta, printed at the Foreign Department Press, 1875: 4to., pp. ii., 107 and 18.

[The above four works were presented by the Secretary of State for India.]

NEW MAPS.

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Deutschen Reiches.—Karte des ——. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Sheets: 510, Schweinfurt; 511, Hassfurt; 512, Lichtenfels; 556, Kaiserslautern; 557, Neustadt a. d. Haardt. Herausgegeben vom topogr. Bureau des K. Bayer. General Stabes. Price 1*s.* 6*d.* each sheet. (*Dulau.*)

Europa.—Verkehrs-Karte von ——, von H. Berghaus. Uebersicht grösserer Eisenbahnverbindung, Telegraphen und überseeischer Dampfschiffahrt, Gezeichnet von M. Risch. Scale 1 : 5,000,000 or 66·6 geographical miles to an inch. Gotha, Justus Perthes. Four sheets mounted on linen, with roller. Price 10*s.* (*Dulau.*)

France.—Carte de ——, dressé par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Paris, 1886. Sheets: V.—19, Belle-Ile (Ouest); VI.—19, Belle-Ile (Est); X.—27, Lesparre; XI.—26, Cognac; XV.—9, Aumale; XVII.—17, Montargis; XVII.—21, Dun-sur-Auron; XVIII.—21, Nevers; XXI.—19, Vitteaux; XXIV.—19, Rioz; XXIV.—26, Chambéry; XXIV.—27, Allevard. Price 7*d.* each sheet. (*Dulau.*)

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Sicilia.—Grande Carta Murale della ——, fisica, politica, storica e commerciale, costruita e diretta dal Prof. G. Gambino del Ro. Istituto Tecnico di Palermo. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Palermo, Remo Sandron, editore. 6 sheets. (*Dulau.*)

This is a large-scale wall-map of the island of Sicily. It is a somewhat rough production, but exhibits clearly all means of communication, and the physical features of the country.

ORDNANCE SURVEY MAPS.

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AFRICA.

Afrika.—Spezial-Karte von ——, im Massstab von 1 : 4,000,000 or 55·5 geographical miles to an inch. 10 Blätt. Entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domann und Dr. Richard Lüddecke. V. Lieferung. Inhalt, Sektion West-Sudan (4) nebst Bemerkungen von B. Domann. Section Seengebiet (8) nebst Bemerkungen von Dr. R. Lüddecke. Gotha, Justus Perthes, 1886. Price 3*s.* each part. (*Dulau.*)

As has been the case with each issue of this map, the sources from which it has been compiled are duly acknowledged. On sheet 8 will be seen the large extent of territory claimed by the Germans, which, with the exception of a few ports, leaves nothing of the mainland in the hands of the Sultan of Zanzibar. The utmost care has evidently been taken in the compilation of this sheet, which contains more information as to the geography of this portion of Africa than can be found in any other map of the same scale. Sheet 4 indicates the manner in which the French Government has advanced the boundaries of their West African possessions into the interior of the Upper Niger Region. The results of all the most recent explorations on the Upper and Lower Niger and Senegambia are given, showing the great advance that has been made within the last few years in our geographical knowledge of these regions. These two sheets complete this valuable map of Africa, which has only been six months in course of publication, and we can bestow no higher praise on it than to say that it is worthy of the occasion it is intended to commemorate, and of the distinguished geographers who have been engaged in its production.

Angola.—Carte d' ——, au 1 : 3,000,000 or 41·6 geographical miles to an inch. Dressé par les officiers de la marine portuguaise. Price 2*s.* 6*d.* (*Dulau.*)

S. Thomé.—Carte de l'Ile de ——, côte occidentale d'Afrique. Scale 1 : 150,000 or 2 geographical miles to an inch. Price 1*s.* 6*d.* (*Dulau.*)

Zaire.—Carte du cours du Rio ——, de Stanley-Pool à l'Océan, dressée par Capello et Ivens. 2 sheets. Price 5*s.* (*Dulau.*)

AMERICA.

Nord Amerika.—Physikalische Wandkarte von ——, von Heinrich Kiepert. Zeichnung von R. Kiepert. Scale 1 : 8,000,000 or 109·2 geographical miles to an inch. Berlin, D. Reimer. 5 sheets. Price 7*s.* (*Dulau.*)

Schingústromes.—Spezialkarte des ——, Nach den Aufnahmen und Ortsbestimmungen von Dr. O. Clauss reduziert auf den Massstab 1 : 500,000 or 6·8 geographical miles to an inch. Petermann's Geographische Mitteilungen, Jahrgang 1886, Tafel 7. Gotha, Justus Perthes. (*Dulau.*)

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in March and April 1886.

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587	Burica point to Mangrove bluff:—Plan added, Chacahua bay.			
50	Diu head to Goapnáth point:—Plans added, Shial Bet. Mahuwa Bandar.			
134	Harbours and anchorages in New Hebrides:—Plan added, Espiègle and Malua bays.			

CHARTS CANCELLED.

No.		Cancelled by	No.
1824*a*	East coast of Ireland, with the Irish channel	New chart, East coast of Ireland, with the Irish channel	1824*a*
1157	Bridgewater port	New plan, Bridgewater port ..	1157
2180	The Orkneys	New charts, Orkney islands, 2 sheets	2180*a*, *b*
1299	Port Barbara	New plan, Port Barbara on ..	1299
516	Mangrove bluff to cape Corrientes	New chart, Mangrove bluff to Cape Corrientes	516
648	Delagoa bay to river Zambesi ..	New chart, Delagoa bay to river Zambesi	648
740	Plans on this chart. Vingorla roads and rocks. Malwan bay	New plans, Vingorla, Malwan bay, on sheet	902
65	Cochin river. Alipee roads	New plan, Cochin river (entrance)	65
2350	Plan of Mourilyan harbour on this chart	New plan, Mourilyan harbour ..	116

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 120. North sea:—Schelde river. 122. North sea:—Mouths of the Maas. 2328. Norway, south coast:—Christiansand to Sandö. 2361. Baltic sea:—Oland to Landsort. 2289. Baltic sea:—The Skagerrak or Sleeve. 2362. Baltic sea, Sweden:—Landsort to Bothnia gulf. 2297. Baltic sea:—Hango head to south Quarken. 2116. Baltic sea:—Great and Little Belts. 2325. North sea:—Liim fiord. 2364. Baltic sea:—Lubeck bay and Femern belt. 2150. Baltic sea:—Femern to Bornholm. 2229. Baltic sea:—Entrance to Great and Little belts. 1187. Mediterranean, Spain:—Alicante to Palamos. 2127. Mediterranean sea:—The Skerki band. Talbot shoal. Pantillaria patch. Graham shoal. 2836, *b*, Mediterranean sea:—Grecian archipelago, northern sheet. 2488. North America.

east coast:—Portland harbour. 2479. North America, east coast:—Black rock and Bridport harbours. 2754. North America, east coast:—Long island sound (eastern part). 2480. North America, east coast:—Block island to Great Egg harbour. 24. South America, west coast:—Channels between the gulf of Trinidad and gulf of Peñas. 364. North America, west coast:—Duncan and Metlah-Catlah bays. 123. Africa, south coast:—Table bay breakwater and docks. 8c. Red sea:—Sheet 3. 8e. Red sea:—Sheet 5. 829. Bay of Bengal:—Cocanada to Bassein river. 859. Bay of Bengal:—Mutlah river to Elephant point. 2135. Bay of Bengal:—Irawaddy river, sheet 1. 823. Bay of Bengal:—Caronge island to White point. 1353. Malacca strait:—Diamond point to North sands. 2760. Sumatra, west coast:—Acheen head to Tyingkokh bay. 928. Eastern Archipelago:—Sulu Archipelago. 943. Philippine islands:—Molucca passages to Manilla. 976. Philippine islands:—Manilla bay. 2577. Philippine islands:—St. Bernardino strait and adjacent islands. 2661*b*. China sea:—China sea, northern portion. 1257. China, north coast:—Ping Yang inlet. Tatong river approaches. 2436. Liu Kiu islands:—Port Unting. 1055. Australia, west coast:—Bedout island to cape Cuvier. 1056. Australia, west coast:—Cape Cuvier to Champion bay. 2124. New Guinea:—Bramble haven to Rossel island.

Bottnische Meerbusen.—Der ——, südlicher Theil. Seekarten der deutschen Admiralität, herausgegeben vom hydrographischen Amte, Berlin. No. 80. Scale 1 : 600,000 or 8·1 geographical miles to an inch. Price 2*s*. 6*d*. (*Dulau.*)

Loanda.—Plan hydrographique de la côte de ——, depuis le Morro das Lagostas à la pointe des Palmeirinhas, dressé par les officiers de la marine portugaise au 1 : 50,000 or 1·4 inches to a geographical mile. Avec un plan détaillé du port de Loanda, du fort de Penedo à Mazanga au 1 : 10,000 or 7·3 inches to a geographical mile. Price 3*s*. (*Dulau.*)

North Atlantic Ocean.—Pilot Chart of the North Atlantic Ocean. May 1886. Published at the Hydrographic Office, Navy Department, Washington, D.C. J. R. Bartlett, Commander U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

Andree, Richard.—Allgemeiner Handatlas in 120 Kartenseiten mit vollständigem Namenverzeichniss. Zweite wesentlich verbesserte und um ein Viertel des Umfanges vermehrte Auflage. Herausgegeben von der Geograph. Anstalt von Velhagen und Klasing in Leipzig. Bielefeld, Velhagen und Klasing, Lief. 1. Price 2*s*.

Nederlandsche Bezittingen in Oost-Indië.—Atlas der ——, naar de nieuwste bronnen samengesteld en aan de Regeering opgedragen door J. W. Stemfoort en J. J. ten Siethoff, Kapiteins van den Generalen Staf van het Nederlandsch Indische Leger. Gereproduceerd, op last van het Departement van Kolonien aan de Topographische Inrichting te s'Gravenhage onder leiding van den Directeur C. A. Eckstein. Snelpersdruk der Top. Inrichting, 1883–85. Price 1*l*. 12*s*. (*Dulau.*)

This atlas contains fourteen maps, drawn on different scales. Sheet 1 is a general outline map of the Dutch East Indies, showing the mail communications between the different islands, and by means of an inset map of the Netherlands, drawn on the same scale, illustrating the proportional areas of that kingdom and its possessions in the East. Sheet 2 contains four maps of Java, on one of which the railways and telegraphs are laid down; another exhibits the positions of military stations, hospitals, schools, and public institutions; the third the density of population; and the fourth languages spoken. Sheets 3, 4, 5 are maps of West, Central, and East Java, on which all means of communication, and elevations above sea-level are given; the comparative importance of towns is also indicated by symbols. Sheets 3 and 4 also contain plans of Batavia and Semarang, on an enlarged scale, and a larger amount of detail is given as regards the whole island than has previously appeared in any

other map. The island of Sumatra is also shown on three sheets, and an astonishing amount of detail is given, especially as regards the western portion. Sheet 9 contains maps of Banka, Billiton, and the Riouw and Lingga Archipelago. Sheets 10 and 11 are maps of the northern and southern portions of Borneo. The boundaries of the territory of the North Borneo Company, as laid down in this map, differ considerably from those given in the company's latest maps, where the southern boundary of North Borneo is marked as running in a direct line from a position south the Sibuco river to Gura Peak in the interior, and thence in a north-westerly direction to the mouth of the Sipitok river, which falls into Brunei Bay. In the map contained in this atlas the boundary of the North Borneo Company's territory is laid down as following a range of mountains from Gura Peak eastwards to Magdalena Peak, where it turns sharply to the south until it reaches the coast at Batoe Tjenagat. This is a very material discrepancy, as the boundary laid down in this map entirely excludes the Siboku river from North Borneo territory, while a special note on the English draws attention to the fact that the English flag was hoisted on the territory claimed on the 7th September, 1883. The amount of detail given in the southern sheet of this map is such that it would lead any one to believe that this portion of the island had been the field of extensive survey operations. Sheets 12 and 13 are maps of the Celebes and the islands between Bali and Timor. On sheet 14, which contains the Residency of Amboina and a map of the Moluccas, only a portion of the Dutch possessions in New Guinea are given, nor does the whole of it appear in this atlas, except in the small index-map at the beginning. The whole of the maps are beautifully executed, and each sheet contains either inset maps or statistical information, and it is by far the best atlas of the Dutch East Indies that has yet been published.

EDUCATIONAL.

Andree, Dr. Richard.—Volksschul-Atlas für die russischen Ostsee-Provinzen in 28 Karten. Riga, Kymmell. Price 1*s.* 6*d.* (*Dulau.*)

Johnston, Ruddiman, & Co.—The "World" series of Class Lesson Maps and Diagrams. 1, Geographical Terms, No. 1, The Sea Coast.—2, Geographical Terms, No. 2, Islands, Bays, &c.—3, Geographical Terms, No. 3, Rivers and Towns.—4, Geographical Terms, No. 4, Mountains, &c.—10, England, Coast-Line and Chief Rivers.—11, England, Physical.—12, England, Counties in Groups.—13, England, Counties and Chief Towns.—14, England, Counties and Chief Towns, *Test.*—15, England, Chief Railways and Canals.—23, England, Minerals.—24, England, Manufactures and Agriculture.—25, Scotland, Coast-Line and Chief Rivers.—26, Scotland, Physical.—27, Scotland, Counties in Groups.—28, Scotland, Counties and Chief Towns.—29, Scotland, Counties and Chief Towns, *Test.*—32, Ireland, Coast-Line and Chief Rivers.—33. Ireland, Physical.—34, Ireland, Counties in Groups.—35, Ireland, Counties and Chief Towns.—36, Ireland, Counties and Chief Towns, *Test.* Ruddiman Johnston & Co., Limited, Edinburgh and London. Prices 1*s.* to 2*s.* 8*d.* each.

The intention of the publishers of this series of maps and pictorial diagrams is to furnish the teacher with the means of imparting, step by step, a complete knowledge of the geography of the British Isles, its surface conditions, and the use to which its soil is put, their mineral wealth, manufactures, and the means of transporting raw and manufactured products, as well as of the division of each country into counties and the position of its chief towns. If the scales of the maps had been larger, they would have been suited for such elementary teaching, but as at present drawn they are much too small to be seen distinctly across a schoolroom of ordinary size. The pictorial diagrams have also the same fault, but they are otherwise in every respect well calculated to fulfil the purpose for which they were drawn.

Pyrenäen-Halbinsel.—Schulwandkarte der ——, von K. Bamberg. Scale 1:800,000 or 10·9 geographical miles to an inch. 12 sheets. Berlin, Chun. Price 10*s.* (*Dulau.*)

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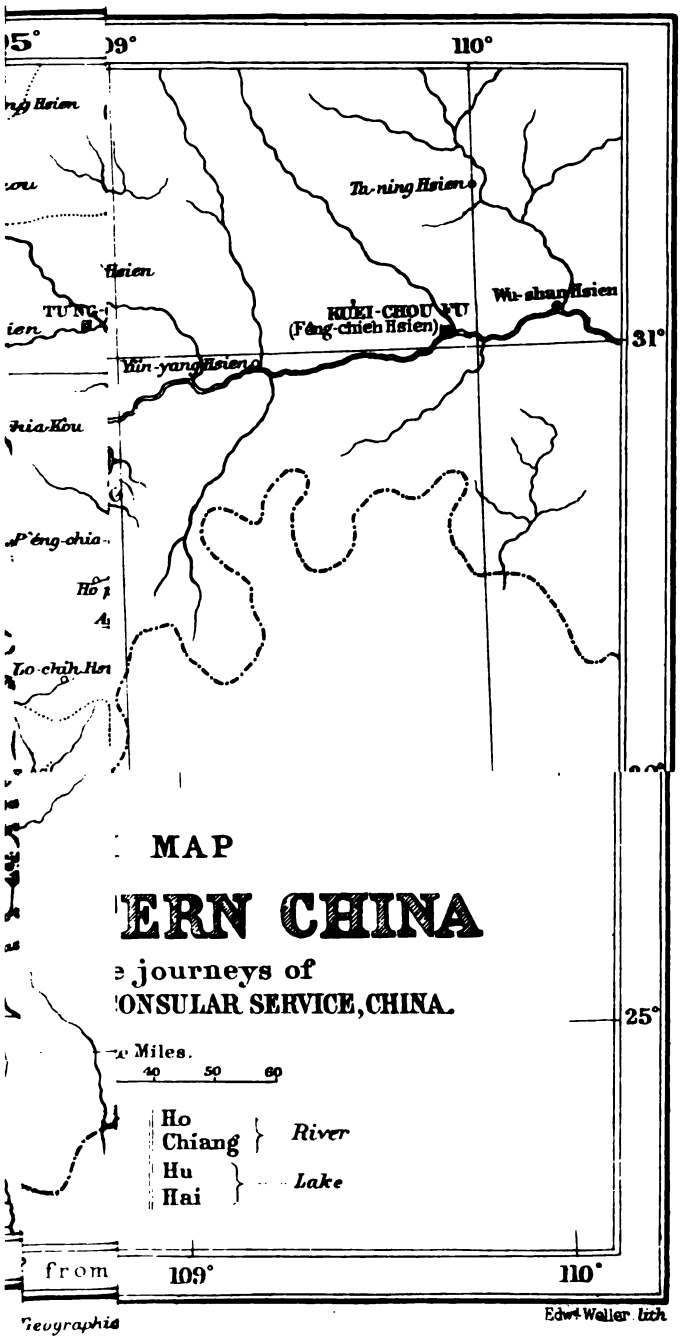
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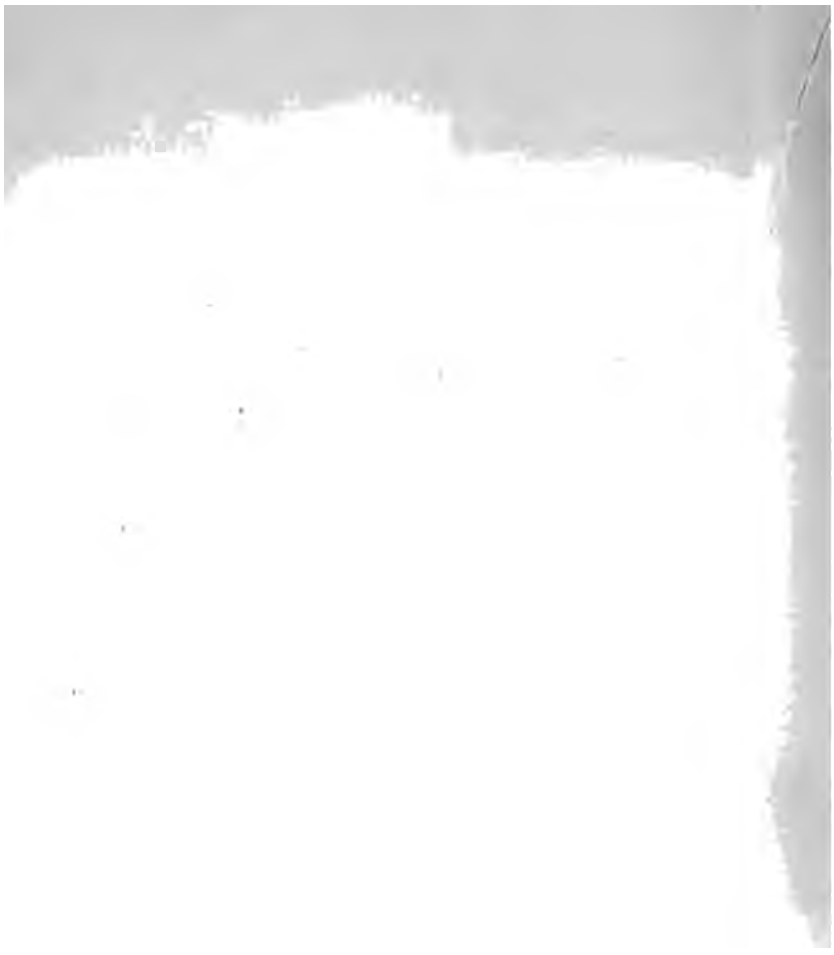

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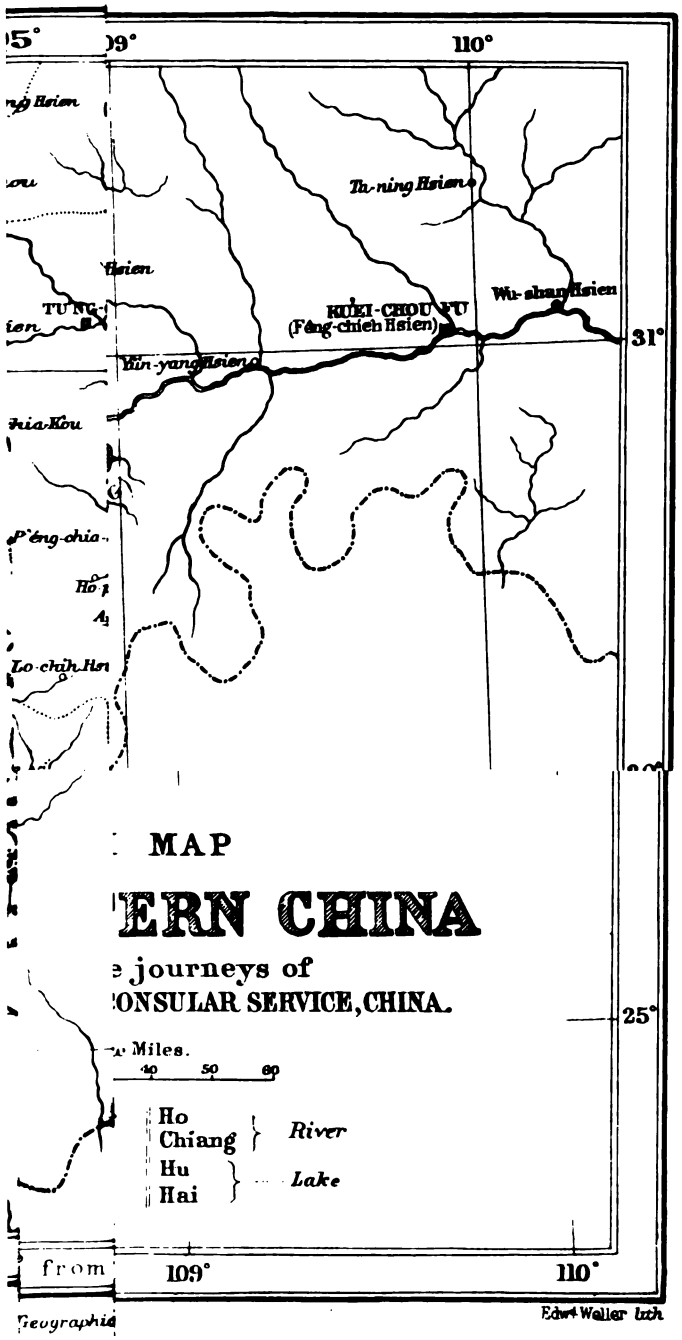
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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

The Annual Address on the Progress of Geography: 1885–6.

By the Most Hon. the MARQUIS OF LORNE, K.T., President.

(Delivered at the Anniversary Meeting, May 24th, 1886.)

THE active work of the Society during the past year has been largely directed towards initiating improvement in geographical education, and I am glad to say with results on which we have a right to congratulate ourselves. "It remains for me," Lord Aberdare concluded his reference to the subject last year, "only to express the fervent hope that this latest effort of the Society to promote the studies which it was founded to extend, may meet with a large measure of success, and tend to lay the basis of a sound and thorough national system of instruction in geography in all its branches—physical, political, and historical." The Report of the Society's Inspector, Mr. Keltie, had just then been presented, and has since been issued and circulated widely. The Report, it may be repeated, describes the results of Mr. Keltie's visits to universities and schools at home and abroad, for the purpose of inquiring into the position of geography in education; it has attracted much attention at home and abroad, and, it is believed, has been productive of good results. The appliances in use in geographical education, collected by Mr. Keltie during his tour of inspection, were exhibited in the months of November, December, and January last. This Exhibition was far more successful than could have been anticipated; it was visited by about 4000 people, all of them having more or less to do with education. It helped to open the eyes of educationists in this country as to the wealth of material which exists in Continental schools for geographical teaching contrasted with the poverty of our own country. Many visitors ordered copies of the maps, reliefs, atlases, and other objects on view, and several of our leading publishers have been stimulated to bring out new and much-improved text-books, maps, and atlases.

An important feature in connection with the Exhibition was the meetings which were held at intervals, and which were largely attended by well-known professors and teachers. At these meetings papers were read on various subjects connected with geographical education, followed by instructive discussions, in which eminent men took part—representatives from our great Universities and public schools, from normal and Board schools. Many evidences have been forthcoming that these meetings and discussions, combined with the Exhibition itself, have had a real and beneficial result on the position of geography in English education.

From London the collection was sent to Manchester, at the request of the Manchester Geographical Society. There it was shown for six weeks, and was largely attended by teachers and others from all the district around that important centre. The number of lectures was increased, and two or three per week were delivered by the professors of Owens College and others well qualified to speak on the various aspects of geography. These lectures were much valued by large audiences. From Manchester the collection has been sent to Edinburgh, where it will be opened for exhibition next month. Lectures and discussions there, also, will form an important feature of the meetings, under the auspices of the Scottish Geographical Society.

The interest excited in the subject by the Society's recent action has been so great, and the expectation that we shall continue it by taking some positive steps towards encouraging improvements in the position of geography in schools and universities is so general, that the Council have felt encouraged and indeed bound to carry the scheme further. The Educational Committee of the Society therefore made certain suggestions to the Council, which are now under consideration, and will probably be adopted. The principal of these suggestions relates to the appointment of a lecturer in geography to deliver courses where the Council may direct. In this matter the Council will take suitable steps to obtain the co-operation of the Universities of Oxford and Cambridge.

In order still further to encourage the scientific study of geography at the Universities, the Committee suggest that a travelling scholarship be offered every year alternately to Oxford and Cambridge, to be awarded, under suitable conditions, to a graduate who has shown marked ability in geographical subjects, and who may desire to visit some little-known district, and communicate the results of his explorations in physical and historical geography to the Society.

Another suggestion is aimed at reaching the intelligent middle and working classes through the medium of the Geographical Lectures at the various centres under the University Extension Scheme. For the purpose of encouraging and improving these lectures a small annual grant is proposed. And finally, in order that all classes of schools may

be reached, it is proposed that prizes be offered for competence in geography to the students at the various training colleges. Here we reach the fountain-head of education, and if we can secure adequate attention to geography in the institutions which send forth yearly troops of teachers to our elementary and middle-class schools, the Society will have accomplished much.

It is evident then, that the Society has already accomplished a great deal. The mind of the public has been aroused and greatly enlightened on the subject; our best schools and universities have expressed their willingness to co-operate as far as possible in carrying out improvements; and there can be little doubt that our proposed further action will bring results which the Council and all interested in geography have long desired.

We may hope now that Manchester and Edinburgh have enthusiastic societies akin to our own, that this matter will receive more attention, and that travellers' tales and observations may form one of the most popular branches of the instruction placed at the command of our youth. I may remark that even in such a thoroughly practical and admirable union as that of the Mechanics' Institutes of Yorkshire it is to be observed that although some instruction on this head is given, it is of a very partial character, and that the information given on the subject of our own colonies is more scanty than on that of other lands. Of late the Government has undertaken to supply accurate knowledge of the capacity of our colonies to absorb the surplus labour power of the old country, and this may prove an additional incentive to know more of those parts of our Empire to which the attention of those who may desire a change of domicile ought to be directed. Knowledge that may prove a deterrent to ill-advised movement is as valuable as the encouragement offered where a change may be made for the better.

It is perhaps characteristic of the absence of theory in the proceedings of the practically minded average Briton, that we who have done more as a nation to explore and colonise the distant parts of the world than any six other nations, should have at home less instruction given in our schools on the subject of geography, than is enjoyed by the youth of most of the European peoples. We have given rein to exploration and enterprise, sailing wherever seas and winds could carry us, and so pushing geographical knowledge, and commerce, if not at haphazard, yet wherever men heard of an opening, investigating on the spot, and with little attempt to proceed on any concerted plan. It may be thought, therefore, that we have done well enough, entering where others have not made their way, and that our present empire in itself is sufficient to give education in commercial geography a permanent place in the individual's range of study, even if school curricula do not enforce the lesson. It is no doubt true that we can trust our cousins of Australia, Canada, and the Cape, to make the bounds of knowledge

wider yet, and that we have gone far and done much without the schoolmaster. But we must remember that however copious may be our store of energy, well-directed effort may often procure an advantage over rivals, when the field is becoming narrower, and according to the proverb, "a stitch in time may save nine."

It is on this account, among other reasons, that we must welcome the steps recently taken to promote a more systematic method of extending a knowledge of the world. Knowledge and sympathy are essential to the consolidation of empire, for if no reasonable ground be seen for the efforts of our kin to occupy fresh regions, they may have to seek in vain for the sympathy which shall make us stand by them in their effort. When it was a mere question of the planting of a flag for the purpose of annexing a new world, it did not signify whether the reasons of the act were understood or no. But when other flags may be planted as well as ours, and trouble may arise from the race for possession, then it becomes of the most material value that the whole body of our citizens should understand the force and the value of the desire of their pioneers to constitute ourselves the first comers and the abiding conquerors of new lands. It is for me, I confess, impossible to look at geography from a standpoint purely scientific. The great and wonderful discoveries of scientific research are most likely to be effected by the wish for material power and empire, and we benefit mankind by furthering the adventures of our countrymen.

Even the discussions on palæocrystic ice derive fresh interest when they are the results of explorations by our kinsfolk of America, or by men belonging to the British services. Each observation bearing on the phenomena of magnetism, the shape of the earth, the altitude of waters, is enhanced in interest by the hope that they may be of use to our people, and that through the following of the example of our people, other nations may in their turn be benefited. There is no doubt that the field is narrowing, that others are pressing us close, and that for the sake of the continuance of that success which we have hitherto enjoyed, we should not be above "taking a leaf" from the books of our rivals. It is in this view that the report of Mr. Scott Keltie is of especial value, and it will not be amiss briefly to repeat his statement that the attention paid to geography in British universities is practically *nil*. Secondly, In public schools very nearly *nil*, as the Society's examinations for their medals prove. When it is attempted it is often given to the most incompetent master, and he has a wretched set of maps. Thirdly, It is required for the public service, and taught—by examiners—I do not know how—says our despairing Inspector!

The only places in England where geography is systematically taught are the training colleges, male and female, and the national Board Schools, with now, and for the last few years, some few

good high and middle class schools. Mr. Keltie advocates the extension of university influence in geographical knowledge through university local examinations, and the founding of chairs for this study. A "Rede" lecture is suggested. The Army and Navy examiners might also, he says, still further encourage geographical knowledge. But it is to the schools we must look for a more general appreciation of its importance. Mr. Hale of Eton says, "Every Swiss school is better provided than Eton or Harrow;" and adds, "The German schools suffered as much as do the English from this want until Karl Ritter was made Professor of Geography at Berlin. The introduction of teaching on this subject in the normal schools is duly pointed out.

It is certainly in singular contrast to our national ineptitude in recognising the value of such education that Germany in her universities devotes so much time and money to it. When Strasburg became again a German possession, the university of that city was richly endowed in regard to this branch of knowledge. Our Society has done practical work in this direction before the recent efforts it has put forth. Travellers have regularly received instruction at its hands, enabling them to take those observations without which map-making is mere guesswork. It has encouraged the acquisition of habits of observation, as well as the mechanical knowledge necessary to use the instruments telling the position of the traveller. Notes on the natural products of the countries visited, the character of man, bird, plant, and beast have been welcomed, along with the remarks on the altitude of the lands and the watersheds of rivers. Intelligent use of opportunities is the mainspring of geographical training, and the noting of "contour" lines of heights, and temperature, and climate, means in every case some valuable deduction as to the commercial value of the discoveries made during the progress of a journey. While constantly encouraging the examination into the most venerable antiquity, the antiquity of nature, such action is a standing protest against the expensive luxury of a training which estimates a knowledge of the antiquities of Carthage as entitled to exclude all contemplation of the novelties in discovery which have created Melbourne, Sydney, San Francisco, and Chicago.

To the soldier the study is of use, for it makes him know how to read a map, how to use it for military purposes, so that points and distances may be recognised and calculated, and that he may divine what is "on the other side, the unseen side, of the hill." To the statesman the study of the science may mean the avoidance of many blunders, the results of which have been only too manifest in our history. Territories which are mere names to the imagination, are easily given away to become the foothold of rivals, when more geographical knowledge would make men cling to regions rich in the capacity of giving homes to a multitude, and affording a fresh anchor for the greatness, and therefore for the unity of the Empire. The science cannot be looked at with indifference

by those who direct the advance of commerce, for they in each fresh adventure may find the path to new sources of wealth. Great masses of mankind are as yet hardly sensible to the pulse of international intercourse and barter. China still hates us as barbarians, and Africa remains the Dark Continent. But it is due to the knowledge gained within the last twenty years that the Congo State has arisen to be the western portal to the interior of Africa, and we may trust that the public spirit of our Cape colonies will before long unite them, in providing by means of a railway a southern entrance, while gold is more likely than the force of arms to make the Upper Nile a third gateway for the advance of civilisation and prosperity.

When distress in England would naturally lead many to seek for an opening in life in countries under our own flag, an ignorance of Greater Britain is especially to be deplored. One of the first things a likely English lad should be told of is the nature of the climate, soil, and occupation afforded by the Cape, Australia, and Canada; and he will be none the worse for an intimate acquaintance with the condition of South America, the United States, or even of less likely fields of enterprise. It is therefore much to be desired that the advice of the Society, whatever shape it may take as to details, may powerfully influence the teaching bodies of Great Britain to give a far larger share than has yet been allowed to detailed instruction in geography.

Patriotism, as well as a love for science, must cause us to rejoice that the work of discovery has recently been aided by our Indian army in Burma, and by the impulse given by Australia to the exploration of New Guinea. We have heard from Mr. Bryce of the teak and rubies and jade of our new acquisition in Asia, and the employment likely to be given to the soldiers of India in hunting out the guerilla bands will strengthen the desire for renewed exploration and for the working of the treasures of a country whose peace is connected with the advance of knowledge and mercantile activity in Siam, and on the pathways leading to China. If congratulatory allusion should be made to our kindred associations in Manchester and Edinburgh, we must recognise with yet warmer greeting the labours of the Australasian Society, which represents so well the national aspirations of the Island Continent. The imagination must indeed be dull which remains unstirred by the recital of the hopes aroused by the aspect of the shores of the splendid island of New Guinea. Her rivers promise extended reaches for navigation; her mountains clothed with wood, and rising sheer above the ocean to a vast height, seem to insure at tactical points of approach, a healthy temperature for Europeans. The death of the British Commissioner may have temporarily checked measures that will lead to the investigation of this country, but we may trust to the enterprise of Forbes and other explorers, and to the activity with which Australasian commercial interests are pushed, for valuable additions to our knowledge of an

island of which it must with some shame be said, that a few birds of paradise have hitherto represented its available export trade. With Baron von Müller as President of the Melbourne branch of the Australasian Geographical Society, we may be sure that the scientific aspects of the investigation of this magnificent new field will not be overlooked, and if a moving interest be not already felt in the subject, it may well be excited by the admirable paper with which the Baron lately opened the session of that association.

In Canada, again, Selwyn, and Dawson, and Macoun, have been engaged in marking the value to science of the recent discoveries in geology, mineralogy, and meteorology made possible by the rapid completion of the Pacific Railway across hitherto unknown mountain ranges, whose ridges are the birthplaces of waters flowing into the Arctic, into Hudson's Bay, into the Pacific, and the Gulf of Mexico. So valuable are the storm signals to be derived from stations in the far North-west, that the American Government has gladly placed the observations of nearly ninety stations at the disposal of the Canadian Government in return for those from about twenty in the British Dominions. At the Great Exhibition this year at South Kensington the system by which the observations of Government meteorological officers are made the basis for storm warnings will be clearly shown. The messages flashed from Toronto and Washington over the American Continent, and across the Atlantic, have already been the means of saving many thousands of lives, and afford the most practical recent proof of the immediate utility of scientific induction. The western points at which the records are kept are spots wholly unknown to the geographer a century and a half ago. At the time when the great bend westwards of the Congo was correctly designated on the maps of the Portuguese, the cartography of all the greatest navigating people,—of the Venetians, of the Dutch, and of the English,—showed a void where lie the splendid countries to the north of the Gulf of California, and westward of Hudson Bay. There are few among our race, whether belonging to the nation of our gold medallist, Major Greely, or to our own, who would not place a higher value on the discoveries in that north-western land, than on those which shall open to us access to the torrid zones. We gladly recognise the gallant efforts made by other races, notably by the Italians, and while we give the gold medal to him whom we may almost call our countryman, we are glad to recognise the aid given to our science by Signor Cora, and we condole with Italy in the recent loss of the leader and members of the expedition recently massacred near Aden.

With regard to the scientific training of intending travellers, which also has an important bearing on the advancement of geography in this country, I am happy to announce that your Council have recently added to the lessons in surveying and mapping, which have for some years past, with excellent results, been conducted under its auspices, offers of in-

struction in the subjects of geology, botany, and photography. Other branches of science connected with geography, it is hoped, may be eventually included in these courses of instruction. Whilst thus endeavouring to improve the mental equipment of our future explorers, the Council has received another addition to its means of assisting or encouraging them in their work, in the munificent donation of 1000*l.* from Miss Gill, the sister of the eminent traveller Captain W. Gill, R.E., who sacrificed his life to his zeal for exploration some years ago. The gift is for the purpose of founding a "Gill Memorial Fund," like the Murchison and other funds, the proceeds of which are annually awarded to deserving scientific travellers.

Proceeding now to review, according to custom, the chief geographical events of the year, I will commence with Asia, a continent which of late years has vied with Africa in the number and interest of the geographical explorations carried out in the little-known regions of its interior.

In the address of last year, your President made a brief allusion to the progress of the eminent Russian traveller Colonel (now General) Prejevalsky, in his recent expedition to the heart of Central Asia, the fourth undertaking of the kind which this indefatigable explorer has carried out. On his former expeditions he traversed Mongolia and pushed his investigations to the borders of China proper, tracing the upper course of the Yellow river to its sources; he also crossed the desert of Gobi, examined the semi-mythical water-basin of Lob-nor, and to the south of it discovered the lofty mountain range of Altyn-tag, and on his third expedition, when he attempted, but failed, to reach Lhasa, he explored a great part of the Tibetan plateau. His object in the last journey was chiefly to trace the northern limit of the great plateau of inner Asia from east to west. After visiting the sources of the Yang-tzse and the Hoang-ho, he turned north and passed the later winter months of 1884–5 at Lob-nor, starting in the spring to cross that part of the Gobi desert which stretches thence to the populated districts of Eastern Turkistan. His letter from the Chira oasis (east of Khotan*), a translation of which is published in our 'Proceedings,' gives a vivid description of the desert borders and the lofty mountain wall along which he travelled for hundreds of miles. The high range which here abruptly limits the Tibetan plateau became higher and higher as he proceeded to the south-west, rising in an unbroken line of snow-capped peaks and ice-fields which reached a height of 22,000 feet. No accessible pass was found by which he could cross to the plateau, and the few streams which descended towards the desert flowed through

* Chira was reached by Mr. W. H. Johnson in 1865 on an excursion across the Kuen-lun, which he made on his own responsibility, whilst engaged in the Indian Trigonometrical Survey. Chira lies east of Khotan, not west, as inadvertently given in 'Proceedings,' 1885, p. 807.

steep clefts, their waters spreading to form little oases in the desert, peopled by a peculiar tribe. Colonel Prejevalsky finally turned north from Khotan and returned to Russian territory viâ Aksu and the Tian-shan. The explorations of this experienced traveller are always carried out with thoroughness, the physical geography, zoology, and botany of the countries visited being attended to as well as geographical survey; his fuller account of an expedition which throws light on this remotest part of Central Asia, will therefore be looked forward to with interest by the scientific world.

An English diplomatic mission to Tibet, from which valuable results to geography and the allied branches of science are expected, is preparing to start from Darjiling at the end of the present month. Associated with Mr. Colman Macaulay, the envoy and chief, are men who have already achieved a high reputation in their several departments, namely Colonel H. C. B. Tanner as geographer, Dr. Oldham as geologist, and Dr. Cunningham as naturalist. Its destination is Lhasa, and the route that it will follow after crossing the Yelap Pass north-east of Darjiling will be along the Chumbi valley and thence to Gyanze.

The interest of geographers in the problem of the lower course of the river Sanpo of Tibet, has been kept up this year by the adventurous journey in December last of Mr. J. F. Needham, assistant political officer in Assam, from Sadiya on the Brahmaputra to Rima on the Zayul-chu. It will be remembered that the Zayul-chu was a crucial point in the controversy respecting the supposed connection of the Sanpo with the Irawadi, which occupied one of our meetings in the previous session. The Zayul-chu was reached by the Pundit Krishna on his remarkable journey from the east, and though he was prevented by the natives from following it downwards, it was maintained by General Walker to be indisputable that this river (with a general course from east to west) was a tributary of the Brahmaputra, and that therefore the evidence was complete against the theory of the Sanpo here flowing north and south to the Irawadi. Mr. Gordon, the advocate of the Sanpo-Irawadi theory, on the other hand maintained that the Zayul-chu was placed too far west on the Pundit's map, and that it was not a tributary of the Brahmaputra. The geographical value of Mr. Needham's recent journey lies in its demonstrating that no such river as the Sanpo flows west of the Zayul, just as the Pundit's journey proved that none flowed to the east; thus the views of those eminent geographers who believe that the Sanpo turns south much farther westward, and is in fact the Dihong, which flows into the Brahmaputra, are materially confirmed.

The settlement of this question by actual exploration by well-qualified observers remains the chief want in Asiatic geography. The undertaking would, however, be one of very great difficulty, not only on account of the physical obstacles which must exist in the unknown part of the river's course, where the Dihong, at the furthest

point reached, flows through precipitous gorges in one of the most rugged countries in the world, but also on account of the fierce and independent temper of the mountain tribes. Some idea of the character of these people may be gleaned from Mr. Needham's lively account, published in our May 'Proceedings,' of a visit made by him to the bordering villages some time before his recent journey to Rima. The great geographical interest of the subject, however, has prompted your Council to take steps towards encouraging an attempt to solve the problem, and with this view they have addressed an inquiry to Mr. Needham as to the possibility of the success of such attempt.

Some addition to our knowledge of the difficult country lying between Assam and the Upper Irawadi was obtained in 1885 by Colonel Woodthorpe and Major C. R. Macgregor, who were sent to examine the trade route between the two rivers by the hills to the north of Manipur. They crossed the snowy range forming the water-parting between the Dehing and the Irawadi by a pass about 8000 feet high, and reached the banks of the northern Irawadi, where no traveller has penetrated since Wilcox in 1828. Silver-mines exist in this region near Pedan, about 100 miles south of which place Colonel Woodthorpe heard that there was a lower pass over the mountains, only 4000 feet high. Major Macgregor is now in England, and it is to be hoped will give us an account of this interesting expedition at one of our meetings in the autumn.

Two meetings of our present Session have been devoted to Burma and the adjoining countries. At one, Mr. Holt Hallett gave us an admirable account of his recent exploration of the region lying between the Lower Irawadi, Northern Siam, and the Chinese border, undertaken with a view to the construction of a railway to connect India with China. The surveys personally made by Mr. Hallett, in great part through a country never before explored, amounted in all to 1500 miles. In testing them for the compilation of his map, they have been found by our draughtsman of great accuracy. The other paper was a lucid and interesting general description of Burma, founded on many years' personal travel and residence in the country, by Mr. J. Annan Bryce. At another of our meetings Mr. J. G. Scott read a paper on Tongking, giving the geographical observations which he had opportunities of making whilst accompanying the French forces during the recent war. The western interior of China occupied us at another meeting, when a paper was read in which Mr. Hosie, one of our Vice-Consuls, gave us much new and curious information gleaned during his extensive travels in the western provinces. The hitherto almost unknown interior of Korea, so recently opened to Europeans, formed the subject of another paper teeming with interesting and original observations on this little-known country, its inhabitants and products, which was read by Mr. Carles, our Consul at the Korean capital, who had undertaken long

journeys through the northern half of the country from the capital to the Chinese frontier.

To the west and north-west of India the work of geography is being carried on by the accomplished officers, Russian and English, who are still engaged in surveying the northern frontier of Afghanistan. Of the results of this important survey, as known up to the end of our last Session, we had a very clear account in the paper by Sir Peter Lumsden in June last, to which I referred in the remarks made on opening the present Session. We have since published in our 'Proceedings' a short paper by Major Holdich on the measures taken to fix the geographical position of Mashad, in north-eastern Persia, in connection with the survey operations of the Afghan frontier, and we have listened with pleasure to Colonel C. E. Stewart's account of his journeys along the eastern frontier of Persia, and his description of the Herat Valley.

The Annual Report on the operations of the Indian Survey is a publication which always possesses a special interest for geographers, and that for 1883–4, which reached England soon after the delivery of my predecessor's annual address, showed that the department, under the direction of Colonel G. C. De Prée, maintains the high scientific standard attained under its former chiefs. The triangulation of India being now virtually completed, the Survey authorities have opportunity to devote an increased number of parties to the prosecution of cadastral or field surveys on the large scale of 16 inches to the mile, a scale which the spread of cultivation and the gradual development of the country render more and more necessary. Nine such parties were at work in the year under review, three of these being in British Burma. In addition to these, eleven parties were engaged in topographical operations. A most useful undertaking, planned and sanctioned by the present Surveyor-General, has been the incorporation into one survey, entitled the 'Indian Transfrontier Survey,' on the uniform scale of 4 miles to the inch, of all the various surveys executed beyond the British frontier. A large number of these transfrontier sheets have been already issued. By this means the great Atlas of India, which has been for so many years advancing towards completion, will have its legitimate continuation in a similar survey, embracing all the extensive territories peopled by India's neighbours, from Siam and China to Persia and the valley of the Oxus.

Among the topographical operations, the description of the survey of the Andaman Islands claims some attention, this being, from a geographical point of view, a virgin field of enterprise. Barren Island and Narcondam, two lonely volcanic islands in the Bay of Bengal, were visited by some of the Andaman survey party, and the chief mountain of the latter was scaled by Europeans for the first time. The curious and almost inaccessible country of Dardistan and Shinaki, on the Upper Indus, peopled by Aryans who have embraced Sunni Mahomme-

danism, was traversed in various directions, and is closely described by Ahmad Ali, a sub-surveyor, whose laborious enterprise seems scarcely to have met with the prominent mention in the Report which it deserves. The mission under Sir Robert Sandeman to the chief of Kharan, an oasis in the Baluchistan desert, enabled the Hon. M. G. Talbot and Lieut. Wahab to carry a triangulation to Kharan and Washuk, and points beyond. Major Holdich, who has since been most actively employed on surveys in connection with the Afghan Boundary Commission, was the moving spirit in an expedition to the important peak of Takht-i-Suliman beyond the Dera Ismail Khan frontier. The survey party and its escort were not allowed to prosecute their operations unmolested by the Sherani tribe, but the hostile natives were soon dispersed, and the surveyors, though disappointed in the hope of fixing many new commanding points from the summit of the Takht (called "Kaisarghar," and 11,300 feet in height), were enabled to usefully increase and improve the topography *en route*.

Probably the most interesting paper in the Indian Survey Report is a detailed account, with map, of the old ring-shaped Lake Palti, or Yamdok-cho, in Southern Tibet. A notice of this, I am glad to say, is being prepared for our monthly 'Proceedings' by General Walker, the late Surveyor-General. In our Secretary, Mr. Clements Markham's, work on Tibet, there is an interesting summary of all available information respecting the lake, which, on the authority of the same survey, and of Du Halde, has been assumed by all successive geographers to be ring-shaped, with an island in the centre. "The Lama," an anonymous agent of the Survey Department, has however now made the complete circuit and survey of the lake, and these results, combined with the fruit of other journeys in Tibet, are embodied in a map in the Report. "The Lama" states that the lake is named Yamdok, or Scorpion, in allusion to its shape, which by an imaginative person might possibly be likened to the reptile in question, but which could not in any case be considered like a ring. The supposed island is in fact a peninsula separating the two claws of the scorpion. Yamdok-cho lies close to the high road between Shigatze and Lhasa, at an altitude of 13,800 feet. Thomas Manning, who visited the lake on his way to Lhasa, in 1811, was struck with its beauty, but he only saw it from one point of view, and from the south and east the sight is described by "the Lama" as much finer. The Yamdok-cho is embosomed by mountains except at the eastern extremity, where they fall and die away in a delightful and far-reaching plain, on the rich sward on which graze thousands of cattle, horses, and beasts of the chase. Villages and monasteries surround the lake, and are dotted all along the small bays which so frequently indent its shores.

I may draw attention to the fact that some noteworthy specimens of the cartographical labours of the Surveyor-General's Department will be

found in the Economical Section of the Colonial and Indian Exhibition at South Kensington. Thirteen statistical maps there exhibit in an interesting form, the material condition of India as regards geology, river-basins, irrigation, crops, rainfall, languages, religion, density of population, internal trade, telegraphs, railways, and roads. An *alto-rilievo* model map of India by Major Strahan is also there to be seen.

The Report for 1884–5, early copies of which have just been received in England, shows that the preliminary topography of India is now approaching completion, and the survey parties are being drafted on to Revenue work. The most important topographical operations still in progress were in Burma, where an extensive field for survey exists; in the Kangra Hills and Punjab native hill States, where the work is intended to serve as a school for military officers, to fit them for reconnaissance in the field; in the Andaman Islands; and in Baluchistan. The scales of these topographical operations varied from a quarter of an inch to four inches to the mile.

The admirable work performed by the survey officers with the Afghan Boundary Commission comprises an independent traverse without a break from Quetta to Kuhsan, a distance of 767 miles. Between Nushki and Kwaja Ali the country was triangulated, and a topographical survey was carried on along two separate routes, embracing an area of about 6000 square miles. The Helmund valley was mapped up to the Hamun, where the Helmund deposits its waters. The total area plane-tabled along the route amounts to 15,000 square miles. Major Holdich and his able coadjutors are still engaged in surveys of Northern Afghanistan, and the Society will be glad to hear that at the instance of the Secretary of State a general report on the geographical work of the Afghan Boundary Commission is to be issued as a separate volume.

Under the experienced leadership of Colonel H. C. B. Tanner, much interesting work has been done during 1884–5, in fixing additional points in the Himalayas, and one result has been to rectify a good deal of the geography of Central and Eastern Bhutan, which proves to have been hitherto based on mere theory. The Lama's explorations in South-eastern Tibet (referred to above) have brought to light the large Lhobra river, which he traced down to within a day's march of the Bhutan fron tier, but what becomes of this river, or which of the branches of the Manás receives its waters, remains to be determined. Colonel Tanner and a native surveyor (R— N—) crossed the Lipu Lek pass at the north-east corner of Kumaun, and endeavoured to explore the country round Takla Khar, but were politely turned back by the Tibetan Governor. They saw enough of this region though to find that the map of the brothers Strachey requires but little correction. Colonel Tanner's companion R— N— completed the arduous task of a circuit round Kinchinjinga, in the course of which he suffered great hardships, and lost two men from excessive cold and fatigue. We have now not only a sketch of that

great mountain, and of the spurs and valleys branching therefrom, but also a delineation for the first time of the boundary between North-eastern Nepal and Tibet.

In the continent of Africa great strides have been made during the year towards completing our knowledge of the great basin of the Congo. Its sources, or the head-waters near its sources, have been reached by two important expeditions—one Portuguese, under MM. Capello and Ivens, two travellers who have added to the laurels gained by their former journey in the interior of Angola and Benguela by crossing the continent from west to east by a route never before traversed; and the other German, which reached the upper waters of the great West African river by crossing Lake Tanganyika. The German expedition is that which was despatched about six years ago to East Africa for the thorough scientific exploration of the region lying between Zanzibar and the Congo basin, the principal achievements of which have been chronicled from time to time in our 'Proceedings.' Its labours were brought to a conclusion a few months ago, Dr. Reichard, the only survivor of the party, reaching Europe last autumn. The latest exploit of the expedition was to push to the south-west, and explore the unknown region to the west of Tanganyika as far as the famed copper-mines of Katanga and the capital of the savage potentate named Msiri. In this region lie the sources of the Lualaba and the Lufira, the head-waters of both which rivers were visited and surveyed, resulting in proving to the satisfaction of the leader that the Lualaba, and not the Luapula flowing out of Lake Bangweolo, 200 miles further east, was the true head-stream of the Congo.

At nearly the same time other adventurous travellers have been exploring the chief tributaries of this vast river in the middle part of its course. First in order of time are the pioneer voyages of Mr. Geo. Grenfell, of the Baptist Missionary Society, who, in the little steamer *Peace*, has ascended and made a running survey of the main river from Leopoldville to Stanley Falls, and ascended nearly to the limits of navigation no fewer than seven of its larger tributaries. The most important of these is the Mobanji, flowing from the north across part of the great blank which has hitherto existed on our maps, in the direction of the tributaries of the Niger. Mr. Grenfell steamed up it about 400 miles, finding it nowhere less than 600 yards wide, and with a mean depth of 25 feet, full of islands, and its banks fertile and thickly peopled. The Boruki, or black river, a tributary of the opposite or left bank, proved also a magnificent stream, which he ascended for 350 miles, finding it at the furthest point reached still 100 yards wide and 12 feet deep.

The largest of the great southern tributaries, known in its upper waters to Livingstone, Cameron, and subsequent travellers as the Kassai, has been explored by an important expedition under Lieutenant Wiss-

man, under the auspices of the Congo Association. His well-equipped party, carrying with them a steel boat, travelled by the usual route, inland from St. Paulo de Loanda, via Malangé, and reached the upper part of the river in October 1884. The navigation was commenced at a point some distance above the junction of the Lulua with the Kassai. Here the expedition, consisting of 200 persons, embarked on the 28th of May, 1885, in their boat and twenty native canoes. Below the mouth of the Lulua, the Kassai was found to assume the aspect of a great river, dotted everywhere with islands, and passing through a country clothed with rich vegetation and generally well peopled. Instead of flowing to the north, and discharging into the Congo north of the Equator, as shown in Mr. Stanley's map, the river was found to trend to the west, in such manner that it received the waters of another great stream, the Kwango, previously supposed to be an independent tributary, the united waters afterwards taking up on the right, the Mfini, a river flowing from Lake Leopold, a sheet of water 75 miles in length, discovered by Stanley, and afterwards entering the Congo as the Kwa. The expedition reached the Congo on the 9th of July last, after a voyage of forty-three days.

These explorations have beyond doubt greatly contributed to enlarge our conception of the magnitude and future possibilities of this great river-basin; for they prove that once the comparatively barren strip of coast-land and the series of rapids and falls have been passed, a vast interior plain is reached, where the broad river and its numerous great tributaries flow without impediment through fertile regions, and present thousands of miles of easy water communication. We shall have the advantage at our next meeting of hearing a description of this region of the Congo from the lips of the late chief administrator of the country, Colonel Sir Francis de Winton.

A brief notice of the explorations that have been carried out in other parts of Africa is all that the necessary limits of this address will permit. Towards the end of our last Session, the Council decided to avail themselves of the services of the experienced East African traveller, Mr. J. T. Last, to follow up the work of Mr. Consul O'Neill in the region between Mozambique and Lake Kilwa or Shirwa, and especially to explore thoroughly the neighbourhood of the Namuli Hills. His instructions were to make an accurate survey of this mountainous district and to study its climate, chief vegetable and animal products, its commercial resources, and the condition of the native tribes, returning to the coast by way of the populous valley of the Likugu. Mr. Last left England on this mission on the 22nd of September last, and reached the junction of the Rovuma and Lujenda, where he took observations to fix the position of this important point, and then proceeded along the banks of the Lujenda to the chain of lakes in which lie its still problematical sources. He reached Blantyre on the 13th of January, and at the beginning of the dry season would make a fresh start for the chief field of his explorations.

A few months before Mr. Last, the whole course of the Lujenda had been followed, but in the contrary direction—from the Shiré to the Rovuma, by Bishop Smythies of the Universities' Mission. In the same part of Africa, the large Portuguese expedition organised on the Mozambique coast by Major Serpa Pinto, which was entrusted to Lieutenant Cardozo on the retirement, through serious illness, of its leader, was, according to our last news, detained for want of stores on the south-eastern shores of Lake Nyassa. In Eastern Equatorial Africa the chief event of the year has been the cruel assassination of Bishop Hannington, by order of the new King of Uganda, on the northern shore of Victoria Nyanza, near the outlet of the Nile. We have been favoured by Mr. Stock, Secretary of the Church Missionary Society, with extracts made by Mrs. Hannington from the diary of the Bishop, which was recovered from one of the king's servants after the murder, and from these brief notes we learn that the route from Mombasa to the lake was, with very slight detours, the same as that followed on the return journey of our Society's expedition under Mr. Joseph Thomson, whose map the Bishop carried with him. The Bishop's journey, therefore, has not added much to our geographical knowledge of the wonderful Masai country, but it is interesting from the rapidity with which it was performed. He left the coast on the 23rd of July, and reached Kavirondo, at the north-east corner of the lake, on the 6th of October.

In the adjoining regions, the numerous and active agents of German commercial societies are no doubt filling up many of the minor blanks in our maps. The expedition of Dr. Fischer, undertaken with a different object, namely, the rescue of Dr. Junker, a Russian scientific traveller, whose retreat from the Upper Nile countries has been cut off by the Mahdi revolt, had been stopped, according to the latest news, on the southern shore of the Victoria Lake by the refusal of the Uganda king to allow him to pass through his country to the Upper Nile. A second expedition for the same purpose, the rescue of Dr. Junker and Dr. Schnitzler (Emin Bey), the late Governor of the Egyptian Equatorial Province, is endeavouring to make its way to the Upper Nile by way of the Congo. It is under the command of the well-known African traveller Dr. Lenz, and has been heard of from Stanley Falls on the Upper Congo.

As illustrating the rapidity with which Africa is being opened up, and how places formerly considered almost inaccessible are now within the scope of a holiday trip to those who know how to set about it, we may mention the journey of our Medallist, Mr. Thomson, to the capitals of Sokoto and Gandu, the two great negro kingdoms of the Central Sudan. In four months from the date of his leaving Liverpool, Mr. Thomson, proceeding by way of the Niger, reached the capital of Sokoto with a party of 120 West Coast negroes. He there negotiated a treaty of great commercial and political importance, and three months later was again in

England, the whole journey having only occupied seven months. Twenty years earlier it would probably not have been done in less than double that time.

In South Central Africa a distinct addition to our knowledge was made by Mr. Montagu Kerr, by his adventurous and hazardous journey from the south across the Zambesi, and through the country of the marauding Angoni tribe to the south-western shore of Lake Nyassa. The paper he read to us on this interesting journey has been published, with an excellent map, in one of the recent numbers of our 'Proceedings.' The recent journeys of Mr. Farini through the Kalahari desert have also brought us an accession of information regarding that part of Africa, which has become more interesting to us from its continuity to our newly-acquired Protectorate of Bechuanaland, the surveys of which, made during the recent expedition of Sir Charles Warren, have not yet been given to the world.

Of scarcely less interest than Asia and Africa is the still unexplored —at least as regards the interior—island of New Guinea. Mr. H. O. Forbes' expedition, which, as you are doubtless aware, has for one of its objects the attempt to cross the Owen Stanley range from Port Moresby, was, according to our last news, still in camp at a native village some miles in the interior, occupied in investigating the botany and zoology of the neighbourhood whilst waiting for the dry season, when the journey to Mount Owen Stanley will be commenced. An expedition liberally equipped by the Geographical Society of Australasia, has meanwhile, under the command of Captain Everill, ascended the Fly river for a distance of 400 miles, and returned to Sydney. A German expedition, led by Dr. Schrader, on an apparently large scale, started from Hamburg in January last to explore German New Guinea, and we hear of a Dutch expedition as in preparation for a similar object with regard to the western portion of this great island which remains a possession of the Government of Holland. Our knowledge of the less frequented islands lying off the coasts of New Guinea and the neighbouring parts of the Western Pacific has been greatly increased during the year by the account given by Captain Cyprian Bridge of his visits to many of them during the cruise of the *Espiègle* under his command, and also by Mr. Romilly, in his charming little volume 'The Western Pacific and New Guinea.'

It is a pleasure to record, as I have just now done, the active part which the Australian Colonies are taking in the scientific exploration of New Guinea. This society was founded at Sydney in April 1883, a branch being established immediately afterwards at Melbourne. Its objects are stated to be the promotion of "scientific, commercial, and educational" geography. It has published two volumes of 'Proceedings,' containing, besides the record of meetings, discussions, and addresses, several original papers of great interest and value.

A few words remain to be said about South America, a continent which still contains wide tracts of unexplored country offering tempting fields to the intelligent explorer. The fuller report of the ascent of Mount Roraima in British Guiana, from the pen of Mr. im Thurn, to which allusion was made in the Annual Address of last year, has since been received and published in our 'Proceedings,' illustrated by a valuable original map from a sketch by Mr. H. J. Perkins, a member of the expedition. Mr. im Thurn came to England towards the close of last summer and read a further account of his remarkable geographical exploit at the Aberdeen Meeting of the British Association. His popular narrative of the expedition I hear is in the press, and will shortly be published. A paper of much scientific interest was read at one of our meetings by Mr. J. W. Wells, on the Physical Geography of Brazil; the fruit of seventeen years' travel and study in this great country. We have also had a contribution from Mr. F. A. A. Simons, favourably known for his exploration of the Sierra Nevada of Santa Marta, on a survey he has more recently made of the Goajira Peninsula, part of the territory of the Colombian Republic. I may also notice as one of the most important contributions of the year to our knowledge of this region, the recent work of M. Lucien N. B. Wyse, 'On the Colombian Isthmus and the Canal of Panama'; a work which could have been written by no one so well qualified as its talented author, who has taken a leading part in the geographical surveys connected with the great engineering enterprise now being carried out. The book is illustrated by two large and instructive maps.

For the following summary of Admiralty surveys during the year 1885 I am indebted to the Hydrographer, Captain Wharton:—

On the shores of Great Britain two surveying vessels have been employed—one on the east coast, principally re-sounding the channels and shoals fronting Lowestoft and Yarmouth, and the other in the Bristol Channel, making a new chart of this important highway.

On foreign surveys, five small steam ships of war (including one Colonial Government gunboat, lent especially for employment on the Queensland coast), and four smaller vessels, manned by 64 officers and 534 men, have been at work. These ships have been engaged in St. Lawrence Gulf and River, Bahama Islands, Mediterranean, Red Sea and Aden Gulf, Indian Ocean (Diego Garcia), China, Eastern Archipelago, Australia, and New Guinea.

The following are the most important additions to hydrography:—

Miramichi Bay and Shediac harbour, in St. Lawrence Gulf, were re-surveyed, and the survey of the Traverses of the St. Lawrence commenced. Little Bahama Bank, West Indies, was completed. Gibraltar Bay was re-surveyed to meet modern requirements, and Sherki Bank and Graham Shoal were thoroughly well examined. In the Red Sea and Aden Gulf, new charts were made of Perim and Trinkitat harbours, of

the passages between Hanish Islands and the African coast, and of Zeila roadstead. At Diego Garcia a detailed survey was executed of the lagoon, lately brought into prominence by the facilities it offers as an ocean coaling station. The astronomical positions of the salient points and off-lying islands between Hong Kong and Shanghai were carefully determined, for the accurate compilation of new charts of the China coast. The survey of the northern entrance to Hai-tau Strait was completed.

In the Eastern Archipelago, the charts embracing the trade routes between Hong Kong and the Australian Colonies, received useful amendments, especially in the neighbourhoods of Mindoro Strait, Banka Strait, and the southern part of Arru Islands. Parts of Wetta Passage frequented by vessels proceeding from Java Sea to Torres Straits were also examined.

In Australia, Port Darwin on the north coast was surveyed in detail, and on the north-west coast a plan was made of Lagrange Bay. On the Queensland coast the shore-line from Gloucester Island to Cape Upstart, hitherto partially explored, was surveyed, and the area between the shore and Barrier Reef sounded out.

On the southern shores of New Guinea, Su-a-u (Stacey Island) harbour, was surveyed, as also Port Moresby, with its approaches through the coral reefs. The channels in the immediate vicinity of East Cape were charted, and several small additions made to the charts of the islands lying immediately off the north-eastern shores of New Guinea, notably in the vicinity of Cape Denis, Trobriand Islands—a region that has hitherto not been delineated at all.

The Marine Survey of British India, under the orders of the Indian Government, in the Bay of Bengal, executed detailed surveys of Tavoy river and Mergui harbour, and examined a large area fronting Dhamra river as far as Mutlah light-vessel. A sketch survey of the Irawadi river from the sea to Mandalay was also made. On the west coast of Hindostan elaborate surveys of Rajpuri river and Bhaunagar Creek were likewise accomplished.

In Canada, progress was made in the survey of the northern channels leading into Georgian Bay, under the direction of the Dominion Government.

The Hydrographic Department during the year 1885 published 54 new charts and plans; also improved 32 charts by the addition of 48 new plans. A report in full detail of the work performed in each surveying vessel during 1885 is in preparation, and will shortly be presented to the House of Commons in accordance with custom.

This bare recapitulation of results achieved reads as a dry enough record, but the history of geography cannot be told sensationally in so brief a list of adventures, and it would require the chief actors themselves to be the living spokesmen of the special paragraphs telling of their triumphs to excite emotion. Yet the mere string of notes telling

of what in a twelvemonth has been accomplished, shows how quick is now the invading march of knowledge. If Alexander sighed for more worlds to conquer, the modern geographer may well indulge in congratulation that he is alive at the present day, for in another century there will be little left to explore, and he will not be made the subject of some pathetic future poem or picture as the last of geographers, left sighing alone for a terra incognita. Our example has been so largely followed that each capital is a centre for the despatch of surveying expeditions. It is perhaps the strongest encouragement for the continuance of our own work, that just as the British Parliament has been the parent of so many others, so the British Geographical Society is the pattern on which many another has been moulded and is being moulded. The gold medal is still the great prize for all the citizens of the world. We welcome with equal honour the man of any nation who may win the race of the year, in the noble struggle which places life and fortune as nothing in the scale, if by one step useful science be advanced. If the noblest science among us is the knowledge of man, we may claim that we work to raise men to a higher level in making each life an aid for the advance of all. Again, each individual's devotion helps the second noblest science when his effort is directed to a knowledge of the features of that earth God has given to be shared among us in proportion as we use the talents of courage, enterprise, humanity, and patriotism.

OBITUARY FOR THE YEAR 1885-6.

Our losses by death during the year ending April 30th were sixty-three, besides one Honorary Corresponding Member. Among the number were many men of distinction as geographers and travellers, or in other walks of life. Biographical notices at greater or less length of some of them have already appeared in the pages of the 'Proceedings,' these are:—Captain Sir Frederick Evans, R.N.; Mr. James Fergusson, F.R.S.; Lord Houghton; Sir Moses Montefiore, Bart.; General Sir Arthur Phayre, G.C.M.G.; Dr. Emil Riebeck; and Admiral J. Lort Stokes. The other deceased members were as follows:—

J. R. Aldom; David B. Blair, who died at Benin on the 23rd May, 1885, a few weeks after his arrival there to fulfil the duties of British Vice-Consul at the Cameroons; N. St. B. Beardmore; James Biggs; G. C. Boor; Dr. Nathaniel Bushell; W. Wootton Blow; Henry C. R. Becher; J. F. Baness, author of the 'Index Geographicus Indicus,' published in 1881; F. Johnson-Bulkeley; J. Clarke; H. C. Carey (late I.N.); Dr. Thomas Colan, R.N., who served in the *Alert* as principal medical officer to the Arctic Expedition of 1875-6, under Sir G. Nares; he was subsequently appointed Inspector General of Hospitals and Fleets, and died on the 18th of last August, at the age of 54; J. Rodney Croskey; Colonel C. Lygon Cocks; the Right Hon. Viscount Cardwell, who died at Torquay on the 18th of February; J. Campbell; Capt. R. Poynton Creyke, R.N.; Lieut.-Col. J. A. Digby; Sir Robert Alexander Osborn Dalyell, Bart., who died at his seat, The Binns, Linlithgowshire, on the 21st of January last, aged 65. He had filled during his lifetime many diplomatic posts in the East,

having been Consul-General at Bucharest in 1857–8, and subsequently private secretary to Sir Henry Bulwer at Constantinople, Consul at Erzerum and at Jassy, and British Commissioner at Constantinople for the affairs of the dedicated monasteries; T. DYER EDWARDES; A. L. ELDER; General F. EBER, for many years *Times* correspondent at Vienna; J. FRAZER (of Sydney, N.S.W.); the Right Hon. W. E. FORSTER, M.P.; J. T. FITZ-ADAM; J. W. GALBRAITH; Captain Sir JOHN H. GLOVER, Governor of Newfoundland, who died, in London, on the 30th of September last. He had been in the Royal Navy, from which he retired with the rank of Captain in 1878; he was Colonial Administrator at Lagos, on the West Coast of Africa, with short intervals of other service, from 1863 to 1872, and in 1874 co-operated with the forces under Lord Wolseley in the Ashanti war by leading a force of 700 Houssas by way of the Volta in a flank attack on Coomasie. For this service he was nominated Knight Grand Cross of St. Michael and St. George. He read a paper on the geographical observations made during this Expedition, at the meeting of our Society on May 11th, 1874, on which occasion Lord (then Sir Garnet) Wolseley took part in the discussion, giving some further information regarding the country. G. A. GIBB; Captain E. HIGHT; the Right Hon. Lord HALIFAX; T. HORSLEY; Rev. J. HANNINGTON, Bishop of Equatorial Africa, who was assassinated by the emissaries of King Mwango of Uganda on the northern shores of Victoria Nyanza, whilst on a peaceful mission to Uganda viâ the new and more direct route from the East Coast viâ Masai-land; R. B. JACKSON; Vice-Admiral J. J. KENNEDY; Rev. JAMES LAWRENCE; Hon. H. SPENCER LAW; J. T. MACKELVIE; C. H. MASTER; W. PAYNTER, F.R.A.S.; General JAMES PUCKLE; Colonel H. W. PREEDY; A. E. PIRKIS; Lord PENRHYN, who died on the 31st of March last, at the ripe age of eighty-six; Colonel CHARLES RATCLIFF; Dr. JAMES DICKSON STEELE; Hon. ROBERT STEIN; C. STENNING; J. M. STUART; Admiral Sir C. SHADWELL, K.C.B., F.R.S., President of the Royal Naval College at Greenwich; an officer who had seen much active service in his time. He died on the 1st March last, at the age of seventy-two; Colonel the Hon. CHARLES S. VEREKER; J. VAN DER ELST; T. M. WEGUELIN, late M.P. for Wolverhampton; H. R. WILLIAMS; S. HENDERSON WILLIAMS, F.S.A., and Lord WAVENEY, F.R.S.

A Recent Journey in the Kalahari. By G. A. FARINI.

(Read at the Evening Meeting, March 8th, 1886.)

Map, p. 480.

SOUTH AFRICA has been very much before the public of late, and there is one part of South Africa, Bechuanaland, which has attracted special notice. Sir Charles Warren's expedition of 6000 men has gone out and successfully restored order in the eastern portion of this new addition to the British Empire; but of the west, the Kalahari desert, nothing definite was known, as I found to my cost, when I determined on visiting that now important but little known region.

I have now returned and am proud to lay a summary of the results of my explorations before the Royal Geographical Society. The lack of

information concerning the Kalahari, not only in England, but even in Cape Colony, struck me as peculiar. I actually learnt more from the half-breed interpreter who accompanied me on my travels than was known at the Cape, either to the Government or to private individuals. Wishing to understand something of the country prior to leaving England, I had visited the principal map-sellers in London with the view of securing a map giving an idea of the Kalahari desert, but I was not successful, the only map having any trace of rivers, mountains, or travellers' routes, being one purchased afterwards in Germany.

The inhabitants on the northern borders of the Orange river knew little or nothing, except that the Kalahari was a sandy waste, dangerous to explore, in crossing which many, including the Bushmen, frequently died of thirst. The few traders (called Smouse in Africander) whom we met and questioned respecting the interior of the country were very reticent, and seemed suspiciously disinclined to favour us with any information except that crossing the sand was equivalent to throwing away one's life, so few who had attempted this feat having returned.

In traversing the whole width of Griqua Land, we had many heavy thunderstorms, which coming from the direction of Kalahari, increased the confidence of our guide who said that as the *sama*, which are small water-melons or gourds, would store up the rain, we should have plenty of water and grass. Game of all sorts he declared would abound, as owing to the continued drought, none had been disturbed for nearly three years in the hunting veldt lying on the northern border of the sands of the Southern Kalahari, now named Koranna Land. This country, extending from the river northwards, is laid out in farms supposed to be three miles wide (some of them are less, but most are more, as they are measured by the distance covered by a horse in half an hour), and governed by laws instituted by a committee appointed by Mr. Scott, the resident Commissioner. It is now inhabited by a race termed bastards or half-breeds, to whom it was given on the conclusion of the Koranna war in recognition of the services they had rendered in suppressing the Koranna Hottentots, and improving them from off the face of the earth.

Our journey into the unknown sands commenced at the Orange river near a spot to which we had been taken by our guide, who on divers occasions had found some very fine diamonds there, one of which weighed 180 carats.

From what I had seen at Kimberley I could tell that these precious stones were plentiful in the neighbourhood, but as the average price is not more than 19*s*. per carat I concluded to let them remain where they were, the finding of another rich mine being calculated to render the supply greater than the demand, and to turn digging for diamonds into anything but a remunerative employment. There is not the slighest doubt, however, that in the near future numerous and valuable mines will be discovered, diamonds being occasionally picked up all over the country.

Having changed our mules for oxen, as being the only animals capable of drawing heavily laden waggons over the soft ground and sandhills, we were prepared to face the terrible dangers of which we had been apprised by our guide and those whom we had met on our journey hither.

Our horses (indispensable adjuncts to an expedition of this kind) were occasionally fed on the wild cucumber growing abundantly on the high tableland adjacent to the Orange river, and between the table mountains which appeared to rise out of the ground every few miles. This was done so as to accustom the horses to the eating of sama, which was similar to the cucumber in flavour and the only substitute for water in the desert.

Our road skirted the Schurve Mountains, in which, as in the Lange Berg range, still linger a few Bushmen, who live in caves. The rock was a kind of hard red sandstone mingled with the general limestone formation, some of which is as white as the chalk of Dover cliffs, and resembles lime fresh from the kiln. The grass, named by the half-breeds "sour grass," was short, and as we rode through it emitted a most pleasant odour, the oxen eating it with avidity, together with a creeping vine with fleshy stalks and bright yellow flowers. At a place called Witte-sand we halted on the edge of a pan for our first water. Pan is the local name for a depression in the ground into which the rain-water flows, and provided the receptacle be deep enough water will be there for months.

As we proceeded little if any change could be observed in the surface of the country. We kept to the high ground, following the old disused road leading to Kuruman. Near the foot of the mountain were several camel-thorn trees and the "three-thorn" and "wait-a-bit" bush, with here and there large patches of young grass. The Namaqua partridge, or sand-grouse, of which we shot over a hundred in one morning, and on which we had lived since our departure from Griqua Land, came in thousands about ten in the morning to drink at the pans.

On the fifth day we perceived in the distance a thin column of smoke, which on nearer approach we found to be caused by the fires of an encampment of Lange Berg Bushmen. They were fine specimens of humanity, far above the medium height, although the race is popularly believed to be altogether stunted. Indeed I could hardly credit the guide when he pronounced them to be Bushmen, but he explained that he had been born among them, and that with the exception of a few colonial Bushmen it was a rare occurrence to find one beneath the ordinary stature. I admired their calm demeanour, and was astonished at their neither asking questions nor soliciting alms, which contrasted so strongly with the impertinent curiosity and mendicity of the half-breeds. Two of them joined our expedition on the invitation of our guide. The artist who accompanied us journeyed up the mountain to

see these people and the caves in which they lived, and while there, happening to notice some curious drawings on the walls, made sketches of them.

We had in the waggon a large supply of *dokka*, which, like the Kaffirs, the Bushmen delight in smoking. When excited by its fumes they played to us in a body on some reeds, producing sounds which sounded very well at a distance, but when heard close at hand were shrill and discordant. Palgrave, in his report, describes the Namaqua Hottentots as playing on their reeds a wild, weird, harmonious music. I agree with the wild and weird, but perhaps through not having a musical ear, I take exception to the term harmonious, as applied to their music.

On leaving the roads of the tableland, which though hard and but little travelled on, are smooth, and would compare favourably with the best macadamised road in England, we came to the sand, the colour of which was different shades of red, white being rarely seen. As far as the eye could reach it lay in waves that appeared to roll towards us from north to south, their hollows and crests extending nearly east and west. Owing to the violent winds the sand in some places had been driven into high hills called kopjes, the Dutch Africander for hill. They are used by the natives and hunters as landmarks. Their peaks were usually barren, but their slopes were covered with grass. Our sextant and chronometer had not yet been required; the guide and the Bushmen were well acquainted with the country, and told us the distance from place to place, reckoning it according to time, an hour being equivalent to six miles. This system of estimating distance was not always reliable, but on making the necessary allowances, the calculations proved tolerably correct, when our actual position was ascertained.

The grass was now knee-high, and the sama the size of walnuts. The fact of the oxen not drinking much water was proof to the drivers that their charges had found and partaken of the melons. The grass being green, the dew heavy, and the oxen, if not driven in the heat of the day, being able to dispense with water for a considerable time, we, thinking that the pans at Tchopo might have dried up, and knowing that no water was to be had for fifty miles beyond that place, took a N.W. by N. course for the purpose of striking Rubini's fountain.

On an average we covered from twenty to twenty-five miles a day, and when the sand was firmer than usual, increased our speed in proportion. As we advanced the grasses grew more plentiful, each variety being in tussocks or bunches from a foot to a yard apart, and relieved by the light-green leaves of the mimosa, or white thorn-bush, which produces gum arabic, a substance eagerly devoured by the natives. Ultimately we arrived at the fountain, an extremely weak one, the flow of which we increased by digging. In the vicinity of the fountain were the remains of a native encampment, the owners of which had, according

to the statement of the guide and Bushmen, taken advantage of the oncoming sama season, and gone into the sand to hunt.

Leaving here, we started for the Lechuana Pool, known as the Hunter's Paradise, the waters of which are alive with aquatic fowl, including the so-called "blackbird," apparently allied to the flamingo. Snipe and partridge (sand-grouse) were present in large numbers, and also the wildebeest (black-tailed gnu) and the hartebeest, two magnificent specimens of which were shot by the Bushmen.

We rested here for two days while the guide and Bushmen reconnoitred. On their return they brought tidings of several patches of sama with fruit as large as oranges, and containing sufficient water for the cattle. We moved forward in the direction of Bakaris, on the dry bed of the Kuruman river, where we expected to find a *werf* or camp of Kattea.

The distance had been estimated at 100 miles, but we had not proceeded half-way when it was discovered that we had passed through the streaks of sama, and were unlikely to meet with any more for some days. Fortunately, we stumbled on a pan which showed signs of having recently held water, and while the others were on horseback, searching for sama, the natives and I dug a hole in the lower end of the pan, to the depth of six feet, and had the satisfaction of finding that the sand was wet, and in another hour of hearing our spades strike the limestone strata, which compelled us to stop. Some hours after, there was nearly a foot of water in our well.

As game was in the neighbourhood, and our store of meat on the decline, we determined to hunt for a day or two. This, my first hunt on the Kalahari, nearly cost me my life, through eating a poisonous instead of an edible bulb. The effect it had upon me was very peculiar: although I could hear and knew everything that took place around me, all muscular control was gone, even to the eyelids. It was some hours before this feeling disappeared, and I was able to walk about as usual.

There were at Bakaris a few miserable huts built by the Vaalpens, who resided in them all the year round, living, when sama was scarce, upon the various vegetable productions of the sand, from which they also sucked up their water, through a reed driven into it as much as five feet below the surface. I was told the women of the camp will in this manner obtain a daily supply of water for a good number of sheep and cattle. The Bechuana Kaffirs, for whom the Vaalpens raise cattle and goats, furnish them with guns and ammunition, and come each year to claim the spoils of the chase, which the real providers hand over without protest, they being content with the extra amount of meat gained by the use of firearms.

Kuis was our next destination, the road taking us across immense savannahs of waving grass, mile after mile, and the intervening hard clay flats, through which ran a dark green line of vegetation, indicating

the watercourses and proving by its profusion that water was near the surface. The "three-thorn bush," and the universal "wait-a-bit" bush (*noi*), intermixed with pretty flowering shrubs, prevailed. But the monotony was relieved by gigantic trees in the perspective, by game in the middle distance, and birds in the immediate foreground.

The night previous to our reaching Kuis we struck a road which the Bushmen said led to Kuruman from Kuis, and thence westward to Mier, five or six days' journey by ox-waggon. We were here introduced to a few natives, Kaffirs and Vaalpens, and to a half-breed, named Makjoe, who was a kind of chief, his wealth in cattle giving him this status. The wells here are supposed to have been dug by the hunters as far back as fifty years ago, in the palmy days when a successful season meant from one to two thousand pounds profit in skins and feathers. Wheat, which is grown without irrigation, is sown during the rainy season, and the ground retaining sufficient moisture throughout the dry winter months, matures it. The little patches of Kaffir melon were watered by hand. We purchased here some very fine oxen and cows, and a horse, and added two half-breeds to our party to hunt on shares; we to provide the arms and ammunition and to take half the skins and feathers of what they killed.

After leaving Kuis the country became more wooded, and we passed along the edge of what seemed to be a dense forest on our right. The sand-billows were more pronounced and close together; the leading oxen of our team often being some distance up one hill before the waggon was down the other, and in toiling up a steep sand-dune one-half the oxen would be descending the opposite side of the incline before the waggon had reached the ridge. The yolk of oxen which came to the apex would often be forced to their knees or driven into the sand the whole length of the leg by the downpull of the leaders.

We travelled on for two days without seeing anything worth relating, but on the third day we were accosted by a Bushman who conducted us to a place where his master, a German smouse (trader), lay half dead for want of food and water. It appeared that he had been up to Damara Land, trading for cattle and skins, and while returning with 250 head of oxen and a well-filled waggon, was attacked by a party of predatory Namaqua Hottentots who, after robbing him of everything he possessed, left him for dead by the side of a noi bush. The faithful little savage concealed himself during the conflict between his master, who made a desperate resistance, and the Hottentots, and when the latter, thinking they had killed the German, had disappeared, issued from his hiding-place and applied to the wounded man the restoratives generally used by those of his tribe. In three days the German had recovered sufficiently to walk, and in company with his preserver started for Kuis with the idea of catching up another trader who had departed from Damara Land at the same time, but failing in this intention he suc-

cumbed to the pangs of hunger and thirst, and but for our opportune arrival, his bones would have soon been bleaching on the sand. Understanding the language and also navigation, he became of great assistance in using the sextant and defining our daily position. On the fourth day our attention was attracted by a small encampment of nomadic Kattea, numbering about fifty men, women, and children, and resembling so far as colour, form, habits, and language are concerned, the Bushmen, over whom they have a slight advantage in point of intellect. They erect their huts in the following manner: sticks are driven into the ground in the form of a half-circle, bent forward so as to give them a half-oval appearance, and then covered with grass and milk-bush. A peculiarity of these quick-built structures is that no protection is afforded against the east wind, the inmates shielding themselves from the western only.

The facial angle of the people appeared little different from that of Europeans. The young girls were perfectly formed, the little black-eyed children really pretty, but the old and middle-aged women, some of whom, judging from appearances, might have seen a hundred years, were the veriest hags. The men were mostly in a state of nudity, and the women wore a piece of skin, in some cases so small, that they might as well have worn nothing. They regarded us with stolid indifference; too proud to beg or to display curiosity at what they saw. But the present of a pipe and tobacco to the women, and a bright new handkerchief to the girls, soon made us friends. The girls brought us wood and sama ready cooked.

It was a lovely spot on which we were encamped. A natural amphitheatre of miniature size, with a background of dark green k'gung trees standing out in bold relief, and in strong contrast to the waving grasses through which the little figures in the foreground flitted to and fro, making a pleasant scene. In compliance with the request of my men, I consented to six of these people following us, and very useful they proved in gathering the edible bulbs which grow abundantly, and, though slightly insipid, are good substitutes for potatoes.

The forest was now so dense that we were unable to see far ahead. There was no scarcity of game for the next few days, which gladdened the hearts of the natives, whose idea of life is to gorge and sleep. There was no change in the scenery until we reached Kang-pan, where a few years ago, Mr. Harris, the partner of Mr. Camm, a trader, was murdered by the Bakalaharis and Bushmen, who decamped with waggons, furs, skins, and money.

From here we passed on to Balala Kraal, a Bechuana name, meaning poor, where they cultivate beans, melons, and Kaffir corn, which they plant in November. To the east of these people exist tribes of Vaalpens, who are their vassals, and who in turn enslave the Bushmen and Kattea.

The tribes on and bordering the desert practise circumcision at the age of sixteen, and sometimes with fatal consequences.

The next place to which we directed our steps was Lehutiting, two days' journey from Balala Kraal. This was quite a large village, with a population numbering several hundreds, situated on a large sandy plain covered with bush and trees. There were also a pan and a fountain or spring. The principal huts were constructed of poles, reeds, and mud, and the inhabitants, called Bakalahari, were a cross between the Matabele Kaffirs, who are offshoots of the Zulus, and Bechuanas, and with their black faces, thick lips, and receding foreheads bear a strong resemblance to the last named. The women are rather masculine. Cattle are raised here, and tobacco, mealies, and melons are cultivated; the latter by being buried in the sand are preserved the whole year.

Maapar, a chief of consequence in these parts, claimed an extensive tract of ground running north to the Ochimbinde, south to the Molapo, and east to Khama and Sechele's Land. To the westward Maapar was ignorant how far his possessions extended.

This part of the country seemed specially adapted for cattle ranching. The open forests provide sufficient shade from the summer sun, water can be had for the digging, Kaffir melons are plentiful, and various kinds of grass grow in the greatest profusion. These grasses are very nutritious food, as shown by the sleek-looking cattle seen at this village every morning hurrying to the pits to be watered.

In speaking of the suitability of this region for cattle ranches I ought to mention that I have had some experience in cattle ranching in the Western States of America. I have visited the whole of that vast grazing country from Texas to Washington Territory, and for many years have farmed an extensive tract of my own land bordering on Lake Ontario.

I discussed the question of English protection with the chief. The natives knew about the mighty Queen who lived far away across the great waters, having heard of her from the Bechuana Kaffirs and such solitary traders as visited them from time to time. The character of the Boers had also reached them, through the wandering tribes whose brethren had been in their employ, and no doubt the tales of their cruelty lost nothing in passing from tribe to tribe. Though showing no satisfaction at the idea of being interfered with, they would prefer anything or anybody to the Boer.

We were now heading nearly direct north for a salt pan named Marurututlu, meaning "big giraffe." Each day now added some new plant, bird, beetle, or butterfly to my collection. The sand-waves were neither so large nor so close as hitherto. On nearing the pan, antelopes, giraffes, and ostriches were sighted in large numbers. The hunters kill sufficient of the former for food, the latter they leave till August, in which month the birds attain their full size, and are valuable for their feathers.

This district has in fact supplied for years all the feathers which have ornamented the dusky warriors, and their sooty brides, of the Bangwaketsis, Baquenas, Baralongs, Baklaras, Battlapins, Bakatlas, and Bamangwatos. The dealers in these decorations are Bechuana Kaffirs, who travel the country three or four in number, coming and going by the way of Kang Pan, Louble, and Goui pits, to Sechele's Land, and carrying their stock-in-trade on a couple of pack oxen. These black tallymen generally have with them a witch-doctor, whose pretended power being vaunted by the Kaffir master, has an evil influence on the naturally superstitious Bakalahari. We met a party of these men at the pan, and my half-breeds, who considered themselves far above the pure black, had as much confidence in the powers of this impostor as any Kaffir.

I found them one morning squatted on their hams in a half-circle round the fortune-teller, whom they were consulting about the possible dangers of our journey. The cunning and assurance of the fellow were superior to those of the racecourse gipsy. He assured his dupes that in spite of dangers and difficulties, the expedition would be successful, that we should see and kill giraffe, rhinoceros, elephant, eland, khoodoo, and ostriches, and that we should be attacked by lions without being injured. Such adventures as those might safely be prognosticated in a country where all the animals mentioned abounded. It was amusing to hear my men when anything was killed, commenting on the truth of their sage's prophecies.

Bidding adieu to the Kaffirs, we wended our way northwards, our road taking us through a forest so dense as to compel us to make detours in order to find open spaces capable of admitting the passage of our waggons. The spoor of giraffe was discovered daily, but we postponed hunting them until our return journey, their skins being too heavy to carry up and back again. Next to the ostrich, they are the most valuable; their thick skins are cut into strips for shoe-soles and whips, and their flesh when dried is very much relished by the half-breeds and natives.

Along the Ochimbinde river, which contained here and there pools of water, grew large camel-thorn, k'gung, hooked thorn, and white thorn trees, the last-named producing sufficient gum-arabic for exportation. The k'gung tree, of which the principal part of the forest is composed, also produces a brownish kind of gum, which might be useful. The wood, which is hard and could be polished, is, with the exception of a portion of the outside, of a bright red colour.

We were eight days going from Lehutitung to Ghanze, the intermediate country being an undulating sandy plain, covered with k'gung trees, grass, flowers, and vegetation. From Ghanze to Lake Ngami we were six days; the lake is getting shallower every year, not for the want of rain, but because the country is gradually rising, which is also occurring in Griqua Land, according to Mr. Christie, the resident commissioner.

Having ascertained from the natives near the lake that a tribe of Bushmen of short stature, or, as they are termed, M'Kabbas, were to the north-west, we searched for and in a few days found them at a pan. At first they were afraid of us, but a few presents combined with kind treatment allayed their fears. Korap, the faithful little man who saved our German friend, was one of this tribe, having been purchased from the Bushmen who had caught and enslaved him. They are by no means so dwarfed as those referred to by the ancient writers and modern travellers; Herodotus terming the inhabitants of the Lybian Desert diminutive men, and Aristotle mentioning them as being a span long. The Arab slave-dealers called them Berekumo, meaning two feet high. Kolle speaks of a tribe of dwarfs south of Baghirmi; Stanley of a dwarf race near the Ugarowa; and Schweinfurth gives a full report of dwarfs called Akkas, who lived near the Mombutto king's country. Du Chaillu saw them at Ashango, and they were called Ohongo; and, according to Battle, there was a nation of dwarfs named Dongo north of the Setto river. Escayrac de Lanture describes them as living near Lake Kocidabo. Krapf refers to a dwarf race existing near the Equator, called Dokko. These resembled Schweinfurth's, whose two Akkas were four feet one inch and four feet four inches respectively; none exceeded four feet eight, the women, on an average, being as tall as the men. Scarcely a doubt can exist that these people, like the Bushmen of South Africa, may be considered the scattered remains of an aboriginal population fast becoming extinct, their isolated existence bearing out this hypothesis.

Having arrived at the ridge which forms the great watershed of this part of Africa, the object of the expedition was accomplished, and we decided to lose no time in starting on our return journey. In order to make the exploration complete, we resolved as we returned to survey the western side, or more correctly speaking, the centre of the Kalahari. It proved to be similar in climate and vegetation to the part I have already described. It was not a barren waste, as it has been supposed to be, but a vast sandy tract, clothed to a large extent with grass, and with k'gung trees scattered over the whole area all the way down to Mier, which is over two hundred miles by the road north of the Orange river. Mier is the headquarters of the captain of the emigrant half-breeds named Dirk Vielander, who claims the country from the Korauna Land north to Quang, and east and west to an indefinite distance.

Wheat, the quality of which is unsurpassed, is cultivated. The red sand is very fertile, and only calls for the sowing of a small quantity of seed. But the people do not take kindly to the labour of agriculture, much preferring cattle and horse raising, the specimens I saw each morning testifying to their skill as breeders. With the exception of the wells at Anoerugus, the headquarters of Bob Duncan the trader-hunter, and the deep well at the junction of the Oup and Nosob, dug by Rautenbach, all the watering-places are the work of Vielander's

people. Rautenbach, whom we visited on our return, formerly hunted and traded here, but is now cattle ranching on a large scale on a tract of land near Mier, purchased from Dirk Vielander.

After a hunting trip with the Vielander's people, up the Nosob, where the game was found in herds of thousands, including the giraffe, a new variety of which, with spots nearly white instead of dark, and much taller than the usual kind, we saw and killed, we prepared to resume our journey to the south.

During one of our hunting excursions we made a discovery, a short description of which may be interesting. While hunting we came across an irregular pile of stones that seemed in places to assume the shape of a wall, and on closer examination we traced what had evidently once been a huge walled inclosure, elliptical in form and about the eighth of a mile in length. The masonry was of a cyclopean character; here and there the gigantic square blocks still stood on each other, and in one instance the middle stone being of a softer nature was weather-worn. A large stone, about six feet in length and the same in width, was balancing on this, and but for its great inertia would have been blown over by the wind. Near the base of the ruined walls were oval shaped rocks, hollowed out, some composed of one solid stone and others of several pieces joined together. These peculiar basin-shaped ovals were regularly distributed every few yards around the entire ellipse. In the middle was a kind of pavement of long narrow square blocks neatly fitted together, forming a cross, in the centre of which was what seemed to be a base for either a pedestal or monument. We unearthed a broken column, a part of which was in a fair state of preservation, the four flat sides being fluted.

We searched diligently for inscriptions, but could find none, and hence could collect no definite evidence as to the age and nature of the structure. The approximate latitude and longitude of this remarkable relic of antiquity were about 23½ S. lat. and 21½ E. long., near the tropic of Capricorn.

From Mier to the Orange river, at every few hours' march were werfs of half-breeds whose cattle dotted the plains. Such cultivation as we saw was done by the white men who had recently settled in the country. The last heavy sand we left behind was to the south of A'beam pool or lake, at Bloemfontein, where Mr. Steyne, whose small herd of sheep and cattle have now augmented to hundreds, has built both brick and stone houses, planted fruit trees, grape vines, &c., and led out the water from a side hill.

Our road was now the dry bed of the Nosob and Kyoup rivers, the high mountainous banks making it very grand and picturesque all the way to the falls of the Orange river which, in spite of being told how impossible it was, we determined to see and photograph.

Whether we succeeded or not may be judged from the photographs

I have brought for exhibition. We had to swim rapids, climb rocks, and descend precipices by ropes in order to take these views. The river here is broken up into many streams by huge rocks and boulders, some of them rejoining to form the main waterfall and others cutting out separate channels to the great gorge, some 400 feet deep and 16 miles long, worn in the solid granite. These streams form many rapids, and when the river is half-full rise and form over a hundred separate cascades unsurpassed for beauty and picturesque grandeur. When the river is full many of them join and form one mighty sheet of water, rivalling the great Niagara as it pours into the abyss nearly 400 feet below. At low water, the only time it can be approached, the Hercules Fall is 165 feet high, with several smaller ones at the sides, which are 350 feet, and caused by the same water before it reaches the main fall.

We spent two weeks exploring these magnificent falls, the scenery of which I venture to think is nowhere surpassed for its fantastic beauty.

In concluding this paper I will make a few general remarks on the region travelled over.

The Kalahari is a high plateau elevated from 3000 to 4000 feet above the sea. For Europeans it is perfectly healthy, the days not being excessively hot and the nights being cool. The average summer heat during the day is 80°, the nights cool. The average winter temperature is 60°, the nights sometimes frosty.

Entering it from the south, the general character is that of open and gently rolling plains, covered with grass, dotted with patches of scrub and mimosa. Approaching the 26th parallel of latitude the country becomes gradually wooded, and afterwards in places is thickly but not so densely wooded as the primeval forests of America. In quality and quantity there is wood sufficient for, and adapted to, any purpose for which wood is used. The trees are called k'gung by the natives, with here and there a camel-thorn. The under-brush are three-thorns, and wait-a-bit bushes, called *noi* by the natives. The k'gung trees are about 25 feet high, and in the park-like forests spread out their branches, giving a good deal of shade; where they grow thicker, they are taller, some three feet in diameter, branching out very low down; but the average size is about 18 inches. They are species of acacia, with fine dark leaves, and the branches covered with hooked thorns about the size of a cat's claws, and equally as strong, bearing a bright yellow flower, and the seed-pods are six or seven inches long, very narrow, furnishing the principal food of the giraffe, that make their home in this almost endless forest of k'gung trees. The red sand is very fertile, and with a small amount of labour would produce all kinds of cereals, the sand retaining sufficient moisture to mature them.

During the occasional droughts, irrigation could be resorted to with but little expense, as, with but few exceptions, water has been found

whenever dug for at a few feet below the surface, and the gentle breezes that continually blow would favour the adoption of windmills in irrigation.

Cattle-breeders who are not afraid of work, could, with the assistance of mowing machines and silos, defy a dry season. The bright sun would cure millions of tons of sweet hay which could be stacked as a reserve. Kaffir water-melons, specimens of which I saw weighing 150 pounds, could be grown for the trouble of planting, and would keep a year if buried in the sand. The vast herds of elands roaming the plains might be domesticated and herded like cattle, producing as much meat, with less cost and risk.

The feathers of the wild ostriches, which have to be killed before the young brood can be captured for domestication, would be an article of commerce at once available.

The sama, or wild melon, when cooked, is preferable to the vegetable marrow, while quantities of edible roots are indigenous to the soil. On some of the hard clay flats the coffee-tree grows. Waggon-loads of truffles could be gathered in a few hours, and the skins of the giraffe and antelope furnish the best quality of leather, easily tanned by native processes.

Native Cultivation.—Such cultivation as I saw was done by the half-breeds, Kaffirs, Bakalaharis, and Balalas. The Vaalpens, Kattea, and Bushmen subsist entirely on the spontaneous productions of the soil and on hunting. They would, if kindly treated, become faithful and attached servants, and be useful to the incoming settlers as herdsmen. But what the Kaffirs have done in their small way proves that all kinds of cereals, fruits, and vegetables indigenous to temperate, and many to tropical zones, may be grown here with ease and in abundance.

The country is fit for English emigrants who are willing to work and undergo the hardships incidental to the life of the pioneer settler, and who have a small capital to tide over the first year and purchase the nucleus of a herd, which can be bought in Damara Land, hard by, at from ten to thirty shillings a head.

The greatest drawback at present is the difficulty in getting to the country, as hundreds of miles have to be travelled by ox-waggons, which is hard to do in a dry season. Before the country can be properly opened up, wells will have to be dug along the roads traversing it.

The Boer is very anxious to get possession of the country, and many of the leading men who hold their political positions by the Boers' vote, say that they are the only people fitted for it, being pastoral nomads. But if we admit that they are pastoral nomads, we must also allow that they will never be anything else, and that, from a progressive point of view, they are a millstone around the neck of advancement. To the surrounding world the Boer is quite indifferent. There is a total absence of interest in anything not actually concerning his immediate

household, or werf. His favourite expression is "God moet oons help," and then he takes another cup of coffee. That, and ill-treating the natives, who cannot be called his servants, but his slaves, are the principal occupations of his life.

The Kalahari forms now a large and important district of the new British Protectorate of Bechuana Land, and it is a district well worthy of further exploration. As the map will show, I have traversed the length of this district, and as the photographs and specimens I have brought home will prove, I have found quite erroneous the vague and disheartening descriptions that have hitherto been all the information that was forthcoming. Most of these descriptions are given by traders, hunters, and others, who evidently do not wish to be disturbed in their profitable desert homes. I have, however, penetrated this terra incognita, and I here place on record what I saw and found there, hoping it will be of practical use not only to geographers, but to commercial men.

For the latter I would state that a country which teems with big game cannot always be barren, and a proof that cattle and sheep thrive are the sleek herds we met with. I hope too, that I have told sufficient to show that the natives are not so scarce as hitherto supposed, but in places are comparatively numerous, and also quite inclined to assist European enterprise, and to take to buying European clothing and other goods. I have also endeavoured to point out that the Bushmen and other local tribes are too little known, and if properly studied in this, their free homes, before they become first contaminated and then exterminated by civilisation, much important ethnological information will be obtained. But I will conclude with the hope that now this great district has become part of the British Empire, these interesting native races will be preserved, and that the English public, in opening up this district for civilisation and trade, will also give lasting protection to the natives.

After the paper,

Mr. Montagu Kerr said he had listened with great interest to the graphic description given by Mr. Farini of his journey through the Kalahari. It was evident that his journey was made at a period when the pale face of the Kalahari had worn an abnormal garb of plenty in its mantle of bright green grass, and it was pleasant to hear such glowing accounts of a country which has for so long had the stigma attached to it of being an inhospitable wilderness and a waterless waste. But he must say that it would have been a greater matter of congratulation had Mr. Farini been able to show a few blue lines of flowing waters—for this would be a question difficult to answer for a practical man: Where is the water that will make this land desirable as a field for the enterprising colonist? We must not lose sight of the unpromising facts when we hear that game abounds. Game is migratory. He (Mr. Kerr) had passed through countries where in the dry months not a solitary duiker could be found, while during the rains the same country was overrun with big game of all descriptions. The lakelets marked upon the map are the result of a favourable rainfall following a severe drought, and their duration is brief. Were countries represented on this principle, Ben Nevis might be an island, and the midland counties of England an inland sea. Although he did not doubt for a moment the beautiful verdure of

the young and succulent grasses seen during Mr. Farini's visit, he questioned very much whether they would be found to exist at other seasons. It had often struck him while hunting on the eastern verge of the Kalahari, or more properly in North-western Bechuanaland, that if that country was dry—for the rivers in Northern Bechuanaland have ceased to be flowing rivers—then we could not expect to find a well-watered country on the western side of the divide. He (Mr. Kerr) was hunting there during the rains. He there enjoyed the pleasures of the nomad's life, and hunted the giraffe on the skirts of this new oasis, and even found in the solitariness of the deserted woods and silent pools food for reflection if for nothing else. It was not, of course, Mr. Farini's fault that he has been unable to speak of running rivers and lasting lakes. This did not detract from the merit of his journey; on the contrary, it added greatly to its value by affording information so important to those who make a study of the prospective fields for colonisation, for it only shows the more strongly the truth of the statements that have before been made by those who have travelled on the borders of the desert. Inquirers should read the description given by Mr. Baines, an explorer of the highest repute for diligence, observation, and unprejudiced opinions, who spoke of this region as being characterised by intense drought. Mr. Farini tells us that the land is rising in the region of Lake Ngami. But be the cause what it may, there could be no doubt that desiccation is asserting itself throughout this northern belt. There is one principle in all estimates which proves a practical basis upon which to found calculations whether they be in respect to land, water, or air. The engineer must always look to the weakest part of the structure as the point of greatest resistance to the load that has to be carried. Then on those principles,—at a glance we see, judging from past experience, that the weakest point in arguments advocating these lands as desirable for future homes for colonists is the inevitable droughts that occur. Wells and windmills are continually suggested, but before a succession of borings have been made, who can say that flowing wells of volume will be found? The majority of the materials for the erection of windmills would have to be hauled by waggon for great distances. He trusted that the hopes of the most sanguine might be realised; but supposing we had wells and a never-failing wind to drive the donkey-pump to fill the cattle troughs, we have not yet strengthened the weakest point. What can be done to sustain your cattle through a long and severe drought? The grasses fade as the year advances, and in the spring-time what can be done to feed your stock? He could imagine some one saying, "Oh! that's the old story!" It was an old question, but it was as awkward to get over as the water jump with the fence in the foreground. We are told ensilage or silos are to cover these protracted periods. With regard to silos, advocated by Mr. Farini, this is a system which under the most expert farmers has not proved successful in all instances. Unless the greatest care is taken in the building of the silo and the stowing of the fodder, there would surely be a large percentage of loss as the grass became sour, and the pit is ruined. The pit-building alone could not be accomplished without labour, and for the white pioneers of settlement in the desert it would be purely an experiment. Those who know the subject of silos would no doubt support him when he said that as a resource for feeding large herds of cattle for many months in the year, the system is as yet undeveloped. Sometimes the African periods of drought are of long duration. The settlements are far from markets, and a farmer cannot be sure of a wheat or corn crop sufficient to sustain his family and farm hands. The only means of transport is by the tardy ox waggons, so that in the present state of affairs silos offered no feasible remedy. Immigrants cannot be made to order; they must be taken as they come. It is the poor, and people of moderate means, with whom we have to deal in questions of emigration. We cannot speculate at their expense.

Capital so far has found no inducement to invest in farming on commercial principles in that country. We cannot expect from the class of ordinary immigrants that high order of scientific farming which is suggested by Mr. Farini. The resources of the immigrant are small, and the purchase of implements and the stocking of the farm eats up in the first year all his capital. We cannot expect to find in the Kalahari that nature would much assist the energetic endeavours of a farmer. Even the reapers spoken of by Mr. Farini would have hard work to do in a country composed largely of sand cones and small hills. America, or portions of the United States, have been frequently compared with these regions in Africa. He (Mr. Kerr) would say—and he spoke from experience, for he had spent a good many years in North America, and had traversed its length and breadth from sea to sea, and from the Tropics almost to the borders of the land of perpetual snow—from what he had seen, the conditions that surround any portion of that great country are so entirely at variance with those which surrounded Africa, that no comparison could be drawn. We see, then, that no market can be offered to immigrants; no natural advantages except boundless acreage; no flowing water; nothing but the charm of experiment, as a scientific farmer working against the heaviest odds ever offered to one in his line. There are good places in Africa, and during or immediately after a good season's rain, it is pleasant to trek by waggon, and to hunt and roam the great waving plains; but when it comes to facing the facts of farming to make a living, to make a home, and to see a future, we cannot look for it in the Kalahari, or its twin sister Bechuanaland. The facts that go to describe this country are as dry as the country itself. Were we to expect better things from this region than from the more favoured spots of the south. Let us take a glance at the garden of South Africa, Natal, which is near the sea, traversed by a railroad, abounding in great rolling hills, clothed with lovely long grass, and freshened by scudding clouds from the Indian Ocean. But even with these advantages forage must be stacked in springtide to sustain the cattle, for the nutritive properties of the grasses fail as the year grows old. It must also be borne in mind that the labour question of South Africa has not yet been satisfactorily settled. And in Natal, with all its advantages, and with the introduction of coolie labour from India (an expensive labour) the farmers have the greatest difficulty in working their farms with profit. He spoke perhaps strongly, but he wished to pluck from the minds of intending colonisers the mirage of false hopes. These regions are deceptive, for when in the dry season all the Veldt is like the high road, barren, sandy, and bare, the region is a desert; but when the rains fall, all nature smiles in verdant colours from the dry and barren Karroo of the Cape Colony to the far stretching plains of the Kalahari. It has never been doubted by any one that the Bushmen existed in the Kalahari mixed with the renegades of the eastern tribes. But has the inquiry ever been made why no one else went there? The contiguous tribes, so far as he could learn, referred to it as an undesirable land except for hunting during fine weather. Under the pressure of early conquest the Bechuana tribes proper never showed themselves as settlers in the Kalahari, although they have for countless years hunted in large parties to the west, and from there have come the ostrich feathers, the hides and skins which have helped to keep alive the drooping trade of their land. In the earlier days we hear of the stronger arm of the Zulu pressing its northward path of conquest, step by step subjecting the weaker tribes to slavery. On sped the tide of tyranny, and across the divide until the triumphant Umzilagazi planted his foot firmly on the lands whose waters flow to the Zambesi, and founded the kingdom of Matabeliland, where to this day they sing the songs of conquest. The conquering Matabeli king will not spread westward for settlement. Why? Because he has tried it already; the fever killed his young men. Then from those fugitive tribes

which Mr. Farini has so ably described, we see the remnant of a race of people whose unhappy history is well known. With the diminutive bow and bone-tipped arrow, poisoned by a root, they have fought for the forlorn hope of existence in more desirable lands, and who through dire necessity have sought refuge in the protecting arms of nature in a country the expression of whose face is the weapon of their defence—a country stamped by the indelible signs of drought—a country coveted by none! In conclusion he regretted very much to hear the few remarks made by Mr. Farini regarding the traders and hunters of the interior. Every one who has visited these remote regions must acknowledge a sincere debt of gratitude to these hardy pioneers of commerce, who are at all times ready to place their hospitality, their knowledge, their experience, and their influence at the service of travellers who come to them for advice.

The PRESIDENT said that if Mr. Farini were present he would no doubt be the first to confess that the aspect of a country altered very much at different seasons. He agreed with Mr. Kerr that great carefulness should be exercised in recommending any country to the too credulous emigrant. Certainly, the want of water seemed an almost insuperable difficulty in the Kalahari desert. In Natal water could be had by boring, but even there at present great difficulty was experienced in obtaining work. Only last week he received a letter from an acquaintance who had been wandering from farm to farm for twenty-five or thirty days, searching for work, having originally been with Methuen's Horse, and there was hardly a single farmer throughout that immense tract of country who could give him any work to do. Until the Natal Government could point out some district in which it could locate emigrants, emigrants to South Africa would undoubtedly do better near to Cape Town than farther inland.

GEOGRAPHICAL NOTES.

Ascent of another Table-topped Mountain in British Guiana.—Mr. H. Whitely, the naturalist traveller, who has explored so much of the interior of British Guiana, and on a former occasion reached the foot of the vertical face of Mount Roraima, has since ascended Mount Twek-kway, a similar mountain, situated about 50 miles N.N.W. of Roraima, on the southern bank of the Carimang river, below the junction of the Aruima. The mountain is not so high as Roraima, but is of similar form, flat-topped, with vertical walls and a long sloping talus from the foot of the walls to the savanna country below. It differs from Roraima in being wooded at the summit and in the foot-slope at one part giving a comparatively easy access to the top. A further difference is in the drainage of the summit. On Roraima the water falls over the edge of the plateau, forming magnificent cascades in the rainy season. On Twek-kway there are no waterfalls, and the water drains off by a cavity of great depth in the middle of the plateau. Mr. Whitely spent twelve months in exploring the mountain and its neighbourhood.

Dr. Lenz's Expedition.—Later news* has been received from Dr. Lenz at Vienna and by Sir F. de Winton. In a letter dated Stanley

* *Vide* 'Proceedings,' *ante*, p. 330.

Falls, February 19th, 1886, the traveller describes the journey up the river from Equator Station, which he left on January 15th. He learnt from Tippo Tib at Stanley Falls that a year previous this influential Arab trader had sent a party which reached the Okyoro river (the Lukebu of Stanley's latest map), the natives of the river being the Wabia, dwelling some days' journey above the confluence of the Okyoro and the Lindi. These Wabia have pursued the Arabs as far as the Congo, and even attacked the Falls Station itself. Ten months before the date of Dr. Lenz's letter, Tippo had sent another expedition of 500 men to the north, but that had not returned; it was only known that it had crossed the Okyoro. If this expedition returned in time Tippo was to give Dr. Lenz 200 to 300 men to accompany him northwards. Dr. Lenz decided to stay for a month at the Falls, and if the expedition had not returned, he would accompany Tippo to Nyangwe, whence he would proceed to Ruanda, and thence onwards to the Mwuta Nzige, accompanied by men whom Tippo could let him have from his seriba in Ruanda. Tippo himself intended to proceed to Zanzibar. On the importance for geography of an exploration from Nyangwe to Mwuta Nzige, Dr. Lenz rightly insists. At the lake he hopes to learn something of the fate of Dr. Junker and the other missing Europeans. Once on the lake he thinks it will not be difficult to reach the upper course of the Welle. Before he left the Falls he would send off another letter, which would probably leave in the *Stanley* in April or May. Dr. Lenz requests that the Austrian Consuls in East Africa be requested to honour any bills he may have to give to Tippo and others, and we are glad to know that the Austrian Government has given instructions in accordance with the request.

Mount Cameroons.—The following account of a journey made (May and June 1885) in the district of Mount Cameroons by two Swedish colonists, MM. G. Valdau and K. Knutson, is taken from Petermann's 'Mitteilungen' (No. 6). The travellers made a complete circuit of the Cameroons group, journeying farther to the north than the Rev. T. J. Comber in November 1877. Comber's route to Lake Richard was along the Mungo and across Bakundu-ba-Nambeleh, but the Swedish travellers followed the route taken by them in January 1885 in company with Dr. Zöller as far as Bwea, then keeping to the west of the Mungo, they directed their course northwards to Lake Richard and Elephant Lake (Balombi-ba-Mbu), round which they travelled. Having explored the district in which the Mene, a tributary of the Rio del Rey Delta, rises, they marched in a westerly direction and arrived at the source of the Mokono, which is apparently an affluent of the Old Calabar. They then returned across the Mene, and reached in a south-westerly direction the coast at Battika. The ethnological information obtained by the travellers is very valuable, more especially as regards the numbers of the natives of the districts traversed, but their expedition is chiefly interesting from

the information it gives us about the Rio del Rey, which under the agreement of 7th May, 1885, should form the boundary between the English territory on the Niger and the German colony of the Cameroons The result of their observations is that the Rio del Rey is not a river, but rather an estuary, consisting of two arms of water, one of which coming from the north-east is the Mene, and the other from the north is connected with the Old Calabar.

Cunene River.—At the meeting of the Geographical Society of Paris, held on 7th May, a communication was read from M. Romanet du Caillaud with reference to the journey made by Father Duparquet, of the Pères du Saint-Esprit mission, to the plateau of Amboella. Starting from Fort Humbe, which is situated at some distance from the right bank of the Cunene, the traveller crossed the river and traversed the kingdoms of Evare and Handa. Leaving the basin of the Kuerahi, he arrived at the plateau. The station founded by him on the plateau, viz. "Notre-Dame-des-Amboella," is situated in 15° 8′ S. lat. and 16° 14′ long. east of Greenwich, at an altitude of 4540 feet, on the right bank of the Okashilanda, a tributary flowing into the Cunene on its left bank. Father Duparquet gives information about the Kuerahi and the Kavundu, which flow between the Cunene and the Okavango. The former of the two rivers, hitherto unknown to Europeans, crosses the territory of Evare, at the extremity of which it forms a lake.

The Reïan Basin.—Mr. Cope Whitehouse has returned to London and communicated to us the results of his latest surveys in the Fayum. In the month of February last, accompanied by Herr Stadler, a skilled engineer in the service of the Government, he explored the basin and ascertained the levelling line between the canal of Gharaq and the promontory which commands the valleys of Reïan es-Sogheïr, Reïan el-Kebir, and Wadi Moëlleh. A datum point was fixed at 40 feet (12 metres) below the Mediterranean in order to survey the whole depression and to examine the Wadi Moëlleh, which is probably identical with the ancient Dionysias, situated according to the Ptolemaïc maps on the long narrow branch of Lake Mœris. The total area of the depression is estimated at 232 square miles (600 sq. km.), with a maximum depth below the Upper Nile of 280 feet. Mr. Whitehouse states that, after having submitted his observations to the experienced judgment of the members of the Egyptian Institute and the Khedivial Geographical Society, he has full confidence in the theories put forward by him four years ago. The possibility of utilising these basins for storing the waters of the Upper Nile is, he says, interesting the public. The Khedive has lent his assistance to the enterprise, and Colonel Scott-Moncrieff, Director of Public Works, proposes shortly to make a general survey of the basins and to calculate the cost of a canal to connect the Nile with the depression. The Mahommedans

regard the project favourably because their traditions attribute the formation of Lake Mœris to the Patriarch Joseph, whose name is preserved in Bahr Jusuf. Should the enterprise be successfully carried out, the volume of water in the Lower Nile would be doubled, and an enormous tract of now abandoned country brought under cultivation.—Dr. Schweinfurth, who surveyed the Reïan basin in January last, has not pronounced in favour of Mr. Whitehouse's theories. He regards the question as not yet ripe for decision. His results, with a map, have been recently published in the 'Zeitschrift' (No. 122) of the Geographical Society of Berlin. His observations for the levelling were only taken with an aneroid. Dr. Schweinfurth's explorations of Birket-el-Qerun have led to the rectification of an error, common to all maps published since the French expedition, of making the lake-basin in Fayum extend from north-east to north-west instead of from east to west as is really the case. The shore-line of the lake is substantially altered by Dr. Schweinfurth's surveys. For the last ten years, and more especially since the sugar cane has ceased to be cultivated at the southern end of the lake, the level of the lake has risen perceptibly; the yearly rise is estimated at 1·18 inches (3 cm.).

Baffin Land.—A detailed account of Dr. Franz Boas' journey (1883–4) to Cumberland Sound and the country west of Davis Straits, is published in No. 80 of the Supplementary Papers of Petermann's 'Mitteilungen.' The chief object of the journey was ethnographical rather than geographical, but Dr. Boas has added considerably to our knowledge of the configuration of the coasts of Cumberland Sound and the north-east coast of Baffin Land. The traveller set sail on 20th June, 1883, and arrived after a favourable passage on 9th July in Davis Straits. Here difficulties began, as the entrance to the Sound was to a large extent blocked by the floating ice driven thither from the Straits by a continuous south wind. It was not until the 26th August that he arrived at Wareham Island, and then some days later at the Island of Kekerten, which he made his headquarters. His first expedition was to the German Polar station at Kingawa, where he was cordially welcomed. Returning almost directly to Kekerten he made several short boat journeys up the neighbouring fjords during the months of September and October. By the end of the latter month most of the Esquimaux who had been away reindeer hunting along the valley between Kingnait and Saumia, and in other districts where the animals abound, had returned to their winter quarters, and the traveller was able to engage a boat's crew. During November the weather was so bad that further excursions were out of the question, changeable winds and heavy snowstorms prevailing during the autumn season in these regions. However, Dr. Boas utilised the time by commencing his ethnological studies among the natives. About the middle of December the ice being sufficiently strong in the upper part of the Sound, he set out with two companions upon a sledge journey to the north, visiting the island of Augpalugtung, where the *Florence* wintered (1877–8). The cold was intense, the thermometer registering on one occasion —48° Centigrade (—54° Fahr.). He was compelled to return again to Kekerten because his supply of provisions was exhausted, and one of his companions had been severely frost-bitten. The beginning of the year 1884 was occupied with a series of sledge excursions all

along the north-west and west coasts of Cumberland Sound. The traveller was well received by the natives of the different islands which lie along this coast, and was enabled to collect valuable information regarding their dialects and modes of life. On 12th March he set out on an expedition to the south, following the east coast of the Sound, and, crossing the tongue of land at the extremity of which is Cape Mercy, he penetrated along the south-west coast of Saumia as far as Cape Fry. Returning again to Kekerten he undertook a short sledge journey up Irving Inlet (Nettilling Fjord) on the west coast. Crossing the watershed between Cumberland Sound and Fox Channel, he at length reached Nettilling Lake. The country round is very flat, the snow-covered plains being only broken by low hills not 70 feet high. On the 6th May Dr. Boas commenced the most important of his expeditions, viz. that along the north-east coast of Baffin Land. Journeying up the Kingnait Fjord, where ice blocks greatly hindered his progress, he was struck with the terrace formation of the river valley. These terraces, on which are small lakes, he calls moraines, the term being applied to similar formations found in the neighbourhood of the German Polar Station at Kingawa. The successive ascents from terrace to terrace made travelling laborious. The crossing of the Kingnait district occupied eleven days, and is regarded by the traveller as the most difficult part of the whole journey. On 22nd May he arrived at Padloping Island on Davis Straits, and commenced in company with one native guide to travel north along the coast. He reached the settlement of Idjunwing on 16th June, and erected his tent near that spot. Storing away all unnecessary baggage therein, he set out again in a northerly direction, touching at most of the islands off the coast of Home Bay. The weather was not favourable, and except in the fjords, where the ice was even, the dogs had hard work to drag the sledge. The farthest point north which he reached was the little island of Sirsartijung, a few miles north of Kukteling Land. This was on the 3rd of July, and it being too late in the year to proceed further, he was reluctantly compelled to turn back. The return journey was accomplished under more favourable conditions. He had intended to remain as long as possible among the Esquimaux and to return home in the autumn, but the condition of the ice was unsatisfactory, so he decided to take the first ship home. No vessel arrived until the end of August, when a Newfoundland ship, named the *Wolf*, cast anchor at the fjord. He went aboard, and reached St. John's on the 7th of September. Dr. Boas concludes the narrative of his journey with some general hints upon the best method and season for travelling in these regions, and his notes upon the provisions, clothing, and men required will be useful to future explorers. He gives a long description of the geographical features of the coasts of Baffin Land and Cumberland Sound, in which will be found a vast amount of new information. But the geographical results of the expedition will be best seen by comparing the excellent maps which Dr. Boas has prepared, embodying his own observations and results of the surveys made by the German Polar station at Kingawa with the latest Admiralty charts. The most important of these results is the rectification of the coast-line of Baffin Land from Exeter Sound to the 70th parallel of latitude N., especially round Home Bay hitherto unexplored, and marked on the Admiralty chart "land seen, but not continuous." The north and east coasts of Cumberland Sound, with the numerous islands situate along them, have been accurately defined, as well as the south-east coast of Saumia, where important alterations will have to be made on existing maps. Much, however, still remains to be done in these regions, which are only known as regards their outlines, while the vast plains of the west offer a still wider field for exploration. The ethnological results of Dr. Boas' expedition are of great importance.

His notes embrace all phases of the life of the Esquimaux, together with their dialects and religion. He discusses the question of the distribution of the different sections of the race and the influence of their local surroundings upon their character. Being dependent upon the chase for their subsistence, they change their dwelling-places to find the best hunting grounds. The following are the seven divisions under which Dr. Boas classifies the Esquimaux of Baffin Land:—(i.) the Sikosuilarmiut or "people of the loose-ice coasts," who inhabit the extreme south-west of Baffin Land, their two chief winter settlements being in the vicinity of King's Cape; in the summer they hunt the reindeer on the plains bordering Fox Channel; (ii.) the Akuliarmiut, or "people of the between land," whose winter quarters are situated on the north coast of Hudson Strait from Broken Point to North Bluff, while in summer they wander to the shores of the fresh-water lake Amakdjuak; they have also a winter settlement in North Bay; (iii.) the K'aumauangmiut, or "people of Lake K'aumauang"; (iv.) the Nugermiut, who settle around the shores of Frobisher Bay and the vicinity, where they hunt the walrus; there is considerable intercourse between them and the K'aumauangmiut, who sail round into Frobisher Bay through the passage between Resolution Island and the mainland; (v.) the Okomiut, or "dwellers in the leeward land," whose haunts are the coasts of Cumberland Sound; (vi.) the Akudnirnmiut, or "the people of the middle land," inhabiting the north-east coast of Baffin Land from Cape Searle to Cape Eglington; (vii.) the Aggomiut, or "people of the windward land," who dwell in the neighbourhood of Prince Regent Inlet. Dr. Boas enters into fuller details regarding the three last-named divisions, as they represent the people living in the regions which he personally visited. The Esquimaux invariably settle where there are extensive ice plains for trapping the sea-dogs. In winter they prefer to congregate for this purpose, but in the summer they are scattered in all directions hunting the reindeer.

THE ANNIVERSARY MEETING, MAY 24TH, 1886.

The Most Hon. The MARQUIS OF LORNE, President, in the Chair.

ELECTIONS.—*Wm. Thos. Arnold, Esq.; Alex. Francis Baillie, Esq.; Colonel Richard C. Brook; Lord Eustace Cecil; William Robert Henderson, Esq.*, M.D.; *S. G. Jones, Esq.; Robert P. Litton, Esq.; Thomas Mackay, Esq.; Edward Nunn, Esq.; David Garbutt Pinkney, Esq.; John Bagot Scriven, Esq.; Robert Sewell, Esq.; Captain Anthony S. Thomson; Theodore C. Walker, Esq.; H. B. de la Poer Wall, Esq.*

PRESENTATION.—*J. H. Croome, Esq.*

At the commencement of the proceedings, the Secretary, Mr. C. R. MARKHAM, read the Regulations which govern the Anniversary Meetings of the Society. After which the PRESIDENT nominated, as Scrutineers of the Ballot, Mr. R. H. MAJOR, F.S.A., and Mr. J. S. DYASON.

Mr. MARKHAM then read the Report of the Council as follows:—

REPORT OF THE COUNCIL.

The Council have the pleasure of submitting to the Fellows the following Report on the financial and general condition of the Society:—

Members.—The number of Fellows elected during the year (ending April 30th, 1886) was 173, besides three Honorary Corresponding Members. In the previous

year, 1884–85, the total elections amounted to 190, and in 1883–84 the number was 183. Our losses have been, by death 63 (besides one Honorary Corresponding Member), by resignation 75, and by removal on account of arrears of subscription 21; making the net increase for the year 16. In the year 1884–85 there was an increase of 13; in 1883–84 an increase of 14. The total number of Fellows on the list (exclusive of Honorary Members) on the 1st of May was 3407.

Finance.—As will be seen by the annexed Balance Sheet, the total net income for the Financial year ending 31st December 1885 (i. e. exclusive of balance in hand and 998*l.* 0*s.* 10*d.*, sale of India Debentures), was 7740*l.* 11*s.* 5*d.*, of which 5625*l.* consisted of entrance fees and subscriptions of Fellows. In the previous year, 1884, the total net income was 8464*l.* 11*s.* 7½*d.*, and the amount of subscriptions, &c., 6246*l.* 18*s.* 4*d.*; in 1883 the two totals were 8599*l.* 9*s.* and 6211*l.* 0*s.* 8*d.* respectively.

The net expenditure for the past year (i. e. exclusive of balance in hand and 501*l.* 11*s.* 6*d.* returned to Society's Bankers) was 8053*l.* 12*s.* 4½*d.*, including 815*l.* spent on Expeditions. The net expenditure in 1884 was 9266*l.* 0*s.* 5*d.*; in 1883, 8624*l.* 2*s.* 11*d.*

The Finance Committee of the Council have held, as usual, Monthly Meetings during the year, supervising the accounts of the Society. The Annual Audit was held on the 7th of April last, the Auditors being, on behalf of the Council, Sir Rawson W. Rawson and S. W. Silver, Esq., and on behalf of the Fellows at large E. O. Tudor, Esq., and J. Duncan Thomson, Esq. The cordial thanks of the Council and Fellows are due to these gentlemen for having freely devoted their valuable time to this important task. At the end of their labours the Auditors drew up the following Report to the Council:—

Auditors' Report.—"The Auditors appointed for the examination of the Accounts of the Royal Geographical Society for the year ended 31st December, 1885, have examined and compared the Account Books and Vouchers of the Society, as described in previous Annual Reports, and have found the same to be correctly stated and sufficiently vouched. They have been kept and submitted in the same satisfactory manner as previously reported.

"The Investments amount to 18,540*l.* 6*s.* 10*d.*, having been reduced by 1000*l.* since 1884 by the sale of Mr. Leigh Smith's special Donation, referred to in last year's Report, and consist of the following securities:—

	£	*s.*	*d.*
North-Eastern Railway 4 per Cent. Debenture Stock	1000	0	0
Great Indian Peninsula Railway 5 per Cent. Stock ..	4000	0	0
Great Western Railway 4½ per Cent. Stock (Davis bequest)	1800	0	0
London and North-Western Railway 4 per Cent. Debenture Stock (Murchison bequest)	1000	0	0
Caledonian Railway 4 per Cent. Preference Stock ..	2000	0	0
Norwegian 4 per Cent. Bonds	1000	0	0
India Stock	1000	0	0
India 3½ per Cent. Debentures	1000	0	0
Consols	3669	2	2
Consols (Peek Fund)	1000	0	0
Consols (Back bequest)	561	0	8
Consols (Trevelyan bequest)	510	4	0
	£18,540	6	10

"The Balance Sheet shows that by the above sale the temporary advance of 500*l.* made by the Society's Bankers in 1884 has been paid off, and the Balance at the end of the year has been increased from 113*l.* 1*s.* 7*d.* to 320*l.* 8*s.* 5*d.*

"But it shows that the Society has received during the year, and should be prepared to expect during future years, a smaller amount from Subscriptions and Entrance Fees than heretofore, which has been met in the past year by a large reduction in the expenditure on Expeditions.

"The falling off on ordinary receipts has been:—

	£
"On Subscriptions (current)	132
" (arrears)	128
Entrance Fees	66
Compositions	319
"Total	£645

"There has also been a reduction of 102*l.* in the sale of Publications and Advertisements compared with 1884, arising solely from the extraordinary sale of the Society's Map of Equatorial Africa in that year.

"On the other hand there has been a

	£
"Saving in the cost of Publications of	424
And on Grants for Expeditions	1460
"Total	£1884

At the same time there has been an increase of 708*l.* under the heads of House (expenses of repairs), Library, Map Room, Meetings, and Scientific Purposes. Most of these are of a temporary character, and more than half the amount (442*l.*) has been expended on the late Exhibition of Geolographical Appliances.

"A comparison of ordinary Receipts and total Expenditure with previous years, as shown in last year's Report, exhibits a satisfactory approach to balancing the Budget, viz.:—

Years.	Ordinary Receipts. £	Total Expenditure. £	Excess of Expenditure. £	
1883	8600	8624	24	£1140
1884	8464	9266	802	
1885	7741	8055	314	

"The equalisation may be completed in the present year, as the Auditors are informed that the Society is not pledged to any heavy extraordinary expenditure, while it will be gratifying to the Fellows to remark that in these three years of heavy expenditure on Expeditions and of admittedly general depression, the excess of expenditure, after applying Mr. Leigh Smith's donation to its intended purpose, has only been 140*l.*

"The arrears of subscriptions, valued last year at 362*l.*, have increased to 465*l.*

"The total Assets of the Society, valued last year at 40,042*l.* 16*s.* 2½*d.*, are estimated this year at 39,330*l.* 4*s.* 7*d.*

(Signed) RAWSON W. RAWSON,
S. W. SILVER,
J. D. THOMSON,
E. O. TUDOR,
Auditors.

"7th April, 1886."

The following Balance Sheet and Statement, showing the Receipts and Expenditure of the Society from the year 1848 up to the present date, are annexed to the Report of the Auditors:—

BALANCE SHEET FOR THE YEAR 1885.

Receipts. 1885.	£	s.	d.	£	s.	d.	1885.	£	s.	d.	£	s.	d.	*Expenditure.*
Balance in Bankers' hands 31st Dec. 1884..	113	1	7				*House*:—Taxes and Insurances, Repairs, Improvements and Furniture, Coal, Gas and Water-rate, &c.	..	..		393	2	4	
Do. Accountant's do.	28	7	9½											
				141	9	4½								
Subscriptions:—							*Office*:—Salaries and Gratuities, Stationery and Printing, Postages and Parcels, &c.	..	..		1,502	11	6	
For the current year ..	3,839	0	0											
Paid in advance	606	0	0											
Arrears..	302	0	0											
				4,747	0	0								
Entrance Fees	..	..		480	0	0	*Library*:—							
Life Compositions.. ..	..	..		398	0	0	Salaries, Books, Binding, &c.	..	..		550	1	0	
Payments made in error	..	..		92	16	11								
Parliamentary Grant ..	..	..		500	0	0	*Map-Room*:—							
Rent of Shop and Vaults	..	..		136	1	0	Salaries and Gratuities, Maps, Instruments, &c.	..	..		1,113	8	10	
Sale of Publications and Advertisements	..	..		503	6	2								
Payments for Scientific Instruction	..	..		41	8	0	*Meetings*..	..	..		201	13	8	
							Scientific Purposes:—							
Loan of Diagrams.. ..	..	..		9	9	0	Scientific Instruction..	77	15	0				
Royal Premium	..	..		52	10	0	Payment to Inspector of Geographical Education	150	0	0				
Sale of 1000*l. India* 3½ *per cent. Debentures*.. ..	..	..		998	0	10	Expenses on account of Geographical Exhibition	292	7	2½				
Dividends:											520	2	2½	
North-Eastern Railway 4 per Cent. Debenture Stock.. .. 1000*l.*	38	17	6				*Medals* and other awards	..	..		200	9	0	
Great Indian Peninsula Railway 5 per Cent. Stock .. 4000*l.*	232	8	6				*Publications*:—Printing Monthly Proceedings, and Vol. I., Part 3, Supplementary Papers, Maps, and Illustrations	..	..		2,689	3	10	
Great Western Railway 4½ per Cent. Stock [DavisBequest]1800*l.*	74	7	0											
London and North-Western Railway 4 per Cent. Debenture Stock [Murchison Bequest] 1000*l.*	38	17	6				*Payments* in error returned	..	..		78	0	0	
							Amount refunded to the Society's Bankers, with interest..	..	..		501	11	6	
Caledonian Railway 4 per Cent. Preference Stock .. 2000*l.*	77	13	6				*Expeditions*:—							
							Grant to Consul O'Neill's Expedition	200	0	0				
Norwegian 4 per Cent. Bonds .. 1000*l.*	38	16	8				Grant to H. O. Forbes' New Guinea Expedition	250	0	0				
India Stock .. 1000*l*	38	15	0											
India 3½ per Cent. Debentures .. 2000*l.*	67	16	3				Grant to J. T. Last's East African Expedition	350	0	0				
Consols 3669*l.* 2*s.* 2*d.*	106	12	7				Bombay's Pension ..	15	0	0				
„ [Peek Fund] 1000*l.*	29	1	3								815	0	0	
„ [Back bequest] 561*l.* 0*s.* 8*d.*	16	6	4				*Balance* in Bankers' hands 31st Dec. 1885..	320	8	5				
„ [Trevelyan bequest] 510*l.* 4*s.* 0*d.*	14	16	6				Do. Accountant's do.	4	9	4				
Interest on 1000*l.* deposited from March 3 to May 27..	5	11	9								324	17	9	
				780	0	4								
			£	8,880	1	7½				£	8,880	1	7½	

REGINALD T. COCKS,
Treasurer.

Audited and found correct, the 7th day of April, 1886.

RAWSON W. RAWSON,
S. W. SILVER,
J. D. THOMSON,
E. O. TUDOR,
} *Auditors.*

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to the 31st Dec., 1885.

	Year.	Cash Receipts within the Year.	Cash Amounts invested in Funds.	Deducting Amounts invested in Funds; actual Expenditure.
		£ s. d.	£ s. d.	£ s. d.
[1]Includes Treasury Grant of 1000*l.* for the East African Expedition.	1848	696 10 5	.. ..	755 6 1
	1849	778 3 0	.. ..	1,098 7 6
[2]Includes Treasury Grant of 2500*l.* for the East African Expedition.	1850	1,036 10 5	.. ..	877 2 10
	1851	1,056 11 8	.. ..	906 14 7
	1852	1,220 3 4	.. ..	995 13 1
[3]Includes Legacy of Mr. Benjamin Oliveira, 1506*l.* 17*s.* 1*d.*	1853	1,917 2 6	.. ..	1,675 6 0
	1854	2,565 7 8	.. ..	2,197 19 3
	1855	2,584 7 0	.. ..	2,636 3 1
[4]Includes Legacy of Mr. Alfred Davis, 1800*l.*	1856	[13],372 5 1	533 10 0	2,814 8 1
	1857	3,142 13 4	378 0 0	3,480 19 9
[5]Includes Legacy of Sir Roderick Murchison, 1000*l.*	1858	3,089 15 1	.. ..	2,944 13 6
	1859	3,471 11 8	950 0 0	3,423 3 9
[6]Includes Mr. James Young's Grant for Congo Expedition, 2000*l.*	1860	[26],449 12 1	466 17 6	5,406 3 7
	1861	4,792 12 9	1,358 2 6	3,074 7 4
	1862	4,659 7 9	1,389 7 6	3,095 19 4
[7]Includes 1009*l.* 14*s.* 6*d.* sale of Exchequer Bills.	1863	5,256 9 3	1,837 10 0	3,655 4 0
	1864	4,977 8 6	1,796 5 0	3,647 7 10
[8]Includes Mr. James Young's Grant for the Congo Expedition, 1041*l.* 14*s.*	1865	4,905 8 3	1,041 5 0	4,507 4 5
	1866	5,085 8 3	1,028 15 0	4,052 15 0
	1867	5,462 7 11	1,029 0 6	3,943 17 4
	1868	5,991 4 0	1,857 3 9	4,156 17 10
[9]Includes Parliamentary Grant of 3000*l.* to Cameron Expedition.	1869	[36],859 16 0	2,131 5 0	4,646 0 8
	1870	[48],042 6 1	3,802 6 0	3,845 10 6
[10]Includes Donation of 500*l.* by Mr. C. J. Lambert.	1871	[56],637 3 7	1,000 0 0	3,726 4 4
	1872	[68],119 7 9	1,999 4 6	5,871 13 2
	1873	[77],761 18 10	2,015 1 8	6,697 12 6
[11]Includes Legacy of Admiral Sir George Back, 540*l.*	1874	[88],753 5 10	499 0 0	7,876 2 3
	1875	7,934 15 10	2,002 7 6	5,683 4 10
[12]Includes Legacy of Sir W. C. Trevelyan, 500*l.*	1876	[911],611 11 8	.. ..	6,870 13 1
	1877	[107],950 1 11	2,538 2 0	8,940 17 11*
	1878	[118],124 10 0	3,000 0 0	6,361 9 6
[13]Includes 1005*l.* 8*s.* 2*d.*, sale of Exchequer Bills.	1879	[128],979 14 10	1,551 10 10	6,990 14 2
	1880	8,599 18 4	1,567 5 1	8,454 1 10†
[14]Includes 1000*l.* received from Mr. B. Leigh Smith.	1881	8,809 19 5	.. ..	8,362 5 6‡
	1882	[138],942 15 0	.. ..	8,779 10 7
	1883	[149],599 9 0	1,001 5 0	8,624 2 11
[15]Includes 500*l.* on loan from Bankers.	1884	[158],964 11 7½	.. ..	9,266 0 5
[16]Includes 998*l.* 0*s.* 10*d.*, sale of India Debentures.	1885	[168],738 12 3	.. ..	8,555 3 10½

* This sum includes the Special Parliamentary Grant transferred to the Cameron Expedition Fund in February, 1877.

† This amount includes the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in this and the previous year.

‡ This sum includes the payment of 102*l.* 8*s.* to the African Exploration Fund; also 714*l.* 9*s.* 1*d.*, the final payment for Cameron Expedition Fund.

STATEMENT OF ASSETS—31st December, 1885.

			£	s.	d.
Freehold House, Fittings, and Furniture, estimated (exclusive of Map Collections and Library insured for 10,000*l.*)		..	20,000	0	0
Investments (amount of Stock), as detailed in the above Report of the Auditors		..	18,540	6	10
Arrears due on December 31, 1885 .. .. £1164 18 0					
Estimated at			465	0	0
Balance at Bank	£320 8 5				
„ in Accountant's hands	4 9 4				
			324	17	9
Total			£39,330	4	7

Publications.—The monthly 'Proceedings' have been issued with regularity throughout the year; the twelve numbers for 1885 forming a volume of 874 pages

illustrated by 25 maps and 4 pictorial diagrams. The total cost of the edition of 5000 copies (including 294*l.* 13*s.* 9*d.* for free delivery to Fellows and Institutions) was 2051*l.* 16*s.* 6*d.* From this is to be deducted the amount of 503*l.* 6*s.* 2*d.* received from sale of copies to the public and from advertisements. One part of the 'Supplementary Papers' (Vol. I., Part 3) was also issued during the year; the total cost of which was 136*l.* 3*s.* 5*d.*

Exhibition of Educational Appliances.—The mission of the Society's Inspector of Geographical Education was completed during the summer, and an outlay of 150*l.* will be found on the Expenditure side of the Balance Sheet under this head. In continuation of the Society's action for the promotion of Geographical Education in this country, an Exhibition of Educational Appliances was held in the winter months, December 1885, and January 1886, the results of which, in attracting the attention of a large section of the public engaged in teaching or interested in the advancement of Geography as an Educational subject, have been very satisfactory. The collection consisted chiefly of specimens of maps, globes, models, text-books, and so forth, obtained by our Inspector during his tour on the Continent, but was largely supplemented by contributions from other countries not visited, and from British publishers and others. The sum of 292*l.* 7*s.* 2*d.* appears in the Balance Sheet as expenditure under this head up to the end of 1885; the remaining expenses, viz. 517*l.* 9*s.* 8*d.*, have been defrayed during the present financial year.

Scientific Purposes Grant.—During the past year fifteen intending travellers have received instruction from Mr. Coles in practical Astronomy in the Society's Observatory, and in route-surveying with the theodolite and plane table in the country. The total number of hours devoted to teaching during the year was 297.

The gentlemen who have received instruction have proceeded to the following destinations:—Chili, Blantyre (S.E. Africa), the country east of Lake Nyassa, Gold Coast, New Hebrides, Niger Region, Venezuela and the United States of Colombia, Alaska, and Northern British Columbia.

Instruments to the value of 344*l.* 8*s.* 6*d.* have been lent during the past year to the following travellers:—Mr. J. T. Last, East Africa, 165*l.* 1*s.* 6*d.*; Lt.-Col. Kitchener, R.E., East Africa, 4*l.* 10*s.*; Mr. H. H. Johnston, West Africa (Cameroons), 87*l.* 15*s.* 6*d.*; Rev. T. J. Comber (Congo Region), 51*l.* 8*s.* 6*d.*; Mr. C. M. Woodford, New Hebrides, 31*l.* 3*s.*; and Mr. W. H. Seton-Karr, British Columbia, 4*l.* 10*s.*

The instruments lent to Mr. A. P. Maudslay (Guatemala) in 1884, Mr. Seton-Karr (Lake Mistassini) in 1885, and Mr. Joseph Thomson (Niger Region in 1885), have been returned.

Library.—During the past year numerous presentations have been made to the Library, both by publishers and private individuals.

666 books and pamphlets have been added during the year; 563 by donation, and 103 by purchase. 90 pamphlets have been put in covers by the Society's map-mounter, and 159 volumes have been bound.

The sum of 63*l.* 14*s.* 6*d.* has been spent in purchasing books, and the further sum of 49*l.* 13*s.* 3*d.* in binding for the Library.

Among the more important accessions are:—Wilkes' 'United States Exploring Expedition, during the years 1838–42,' 5 vols., and an Atlas; Hales' 'Ethnography and Philology' of the same; continuation of the Reports of the Scientific Results of the Voyage of the *Challenger* (by the Lords of the Treasury); the publications of the Intelligence Department of the War Office, and of the Meteorological Office; continuation of the General Report of the Survey of India, Statement exhibiting the Moral and Material Progress and Condition of India during the year 1882–3, 2 parts, 15 district Gazetteers of the Punjab, Rees' 'Notes of a journey from Kasveen to Hamadan,' and Yule and Burnell's 'Glossary of Anglo-Indian Words' (H.M

Secretary of State for India); continuations of the Memoirs and Records of the Geological Survey of India (the Indian Government); Dawson's 'Memoirs of Hydrography,' 2 parts (Mr. H. W. Keay); the Publications de l'École des Langues Orientales Vivantes (the French Minister of Public Instruction); various publications of the Dépôt des Cartes et Plans de la Marine, the Chinese Imperial Maritime Customs, and the Victoria and Queensland Governments; Monographs of the United States Geological Survey, Vols. IV.–VIII., Bulletin of the U.S. Geological Survey, Second and Third Annual Reports of the Bureau of Ethnology, Tables of Geographic Positions, Azimuths, Distances, &c., in connection with the Geographical Surveys West of 100th Meridian, Report of the Expedition to Point Barrow, Alaska, Tenth Census of the United States, 1880, 11 vols., and Report of the Cruise of the Revenue Steamer *Thomas Corwin*, in the Arctic Ocean, 1881; Progress Report of the Geological and Natural History Survey of Canada (the Director of the Survey); the Norwegian North-Atlantic Expedition (the Editorial Committee); Tissot's 'Géographie comparée de la Province Romain d'Afrique,' Tome I.; Groome's 'Ordnance Gazetteer of Scotland,' 3 vols. (the Publisher); M'Crindle's 'Ancient India as described by Ptolemy' (the Author); Desgodins' 'Le Thibet d'après la Correspondance des Missionaires,' 2nd edition; Orueta y Duarte, 'Informe sobre los Terremotos ocurridos en el sud de España en Diciembre de 1884 y Enero de 1885' (the Society of Physical and Natural Science of Malaga); Helmersen and Schrenck's 'Beiträge zur Kenntniss des Russischen Reichs,' Zweite Folge, Band VIII.; Balfour's 'Cyclopædia of India,' &c., 3 vols.; Harrisse's 'Christophe Colomb,' Vol. II.; Wyse's 'Canal de Panama' (the Author); six MSS. relating to the Rio de la Plata, Paraguay, &c.; Lowell's 'Chöson'; Moser, 'A Travers l'Asie Centrale'; Ibrahim-Hilmy's 'Literature of Egypt and Soudan'; Greely's 'Three Years of Arctic Service,' 2 vols.; Codrington's 'Melanesian Languages' (the Publishers); Findlay's 'North Pacific Directory,' 3rd Edition (Mr. R. H. Laurie); Catalogue of the Printed Maps, &c., of the British Museum, 2 vols. (the Trustees of the British Museum); Hertslet's Collection of Treaties, Vols. XV. and XVI.; Hull's Memoir on Physical Geology and Geography of Arabia Petræa, &c. (the Author); Horsford, 'John Cabot's Landfall in 1497'; Woods' 'History of the Discovery and Exploration of Australia,' 2 vols.; 'Encyclopædia Britannica,' 9th Edition, Vols. XIX. and XX. (Messrs. A. and C. Black); Heylyn's 'Cosmography,' 1682 (Andrew Hay, Esq.); Falkner's 'Description of Patagonia' (C. W. Parish, Esq.); Pinka's 'Madeira e Mamore. Relatorio' (the Author); 'Notices Coloniales publiées à l'occasion de l'Exposition Universelle d'Anvers en 1885,' 3 vols. (the French Ministry of Marine and the Colonies); and Mager's 'Atlas Colonial.'

Map Room.—The accessions to the Map Room Collection during the past year comprise 1662 Maps and Charts on 2138 sheets; 12 Atlases, containing 485 sheets of Maps, and 124 Photographs and Views. Of these 54 Maps on 284 sheets, and seven Atlases have been purchased.

Among the most important donations to the Map Room Collection are:—852 sheets of the Ordnance Survey of the British Isles (presented by the First Commissioner of Public Works, through the Director-General of the Ordnance Survey); 102 sheets of British Admiralty Charts (The Lords Commissioners of the Admiralty, through the Hydrographer); 276 sheets of the various Indian Government Surveys (H.M. Secretary of State for India); 42 French Charts (Dépôt des Cartes et Plans de la Marine); 18 United States Charts (Commander J. B. Bartlett, U.S.N., Hydrographer to the Bureau of Navigation); 187 United States Coast Survey Charts (Director of the U.S. Coast and Geodetic Survey); 26 Maps, including those published in Petermann's 'Geographische Mitteilungen,' and Spezial Karte von Africa (Herr Justus Perthes); 6 Maps and Atlases published by Messrs. W. & A. K.

Johnston (the Publishers); 69 Maps of various parts of the World, and a 24-inch Terrestrial Globe by Prof. Guido Cora (Prof. Guido Cora); 16 Maps accompanying Report on Forest Trees of North America (Dept. of the Interior, Washington); 2 Albums containing 60 Photographs of Gold Coast, Lagos, Cape Coast Castle, &c. (J. W. Rowland, Esq.); Parts I., II. of Richthofen's Atlas von China (Dietrich Reimer); 7 sheets of the Geological Survey of Sweden (l'Institut Royal Géologique de la Suède); 5 sheets of Generalstabens Topographiske Kaart over Danmark (the Danish Minister of War); 51 Russian Views and 16 miscellaneous Maps and Plans (Sir Joseph Hooker); Map of Japan, Geological and Topographical (Dr. E. Naumann); 14 sheets of La Carte d'Afrique (Dépôt de la Guerre, Paris (Carte Général de l'Isthme Colombien, and Plan Panoramique du Canal Interocéanique (M. Lucien N. B. Wyse); Movable Diagram illustrating the seasons, and day and night, designed by J. Mason (J. Mason, Esq., through Messrs. T. Ruddiman Johnston).

The Maps in the Society's Collection have been made frequent use of by the Fellows of the Society, public officers, and the general public. The large Maps and Views have been lent to illustrate lectures delivered at the Scottish and Manchester Geographical Societies as well as other public institutions, and to private individuals. Nine new diagrams have been constructed on the premises, and important additions and alterations made to five others.

The adoption of the above Report was moved by General Sir H. E. L. Thuillier, R.E., F.R.S., and seconded by Sir T. Fowell Buxton, Bart., who congratulated the Council on the very successful Exhibition held last winter, of appliances for teaching geography. On being put to the meeting, the motion was carried unanimously.

PRESENTATION OF THE ROYAL MEDALS.

The Royal Medals of the year for the Encouragement of Geographical Science and Discovery had been awarded by the Council as follows:—

The Founder's Medal to Major A. W. Greely, of the United States Army, Commander of the United States Arctic Expedition of 1881–4; for having so considerably added to our knowledge of the shores of the Polar Sea and the interior of Grinnell Land; the first, through the exploration of the late Lieut. Lockwood along the northern coast of Greenland, as far as 83° 23′ 48″ N., being the nearest to the Pole ever attained, and the second, by his own explorations into the interior of Grinnell Land, together with the journey across it to the Western Sea, by Lieut. Lockwood. Also, for his admirable narrative of the Expedition which he has just given to the world.

The Patron's or Victoria Medal to Signor Guido Cora, for his important services as a writer and cartographer in advancing geographical knowledge, promoting the study of geography, and defining its position as a science; for his well-known publication 'Cosmos,' which for twelve years has greatly aided the progress of geography, and for his valuable map of Italy in which the topographical and hydrographical work of his Government are embodied for the first time.

In addressing His Excellency E. G. Phelps, United States Minister, who attended to receive the medal on behalf of Major Greely, the President said, he considered himself most fortunate in that it was his duty to present to Mr. Phelps, as the representative of America and of his distinguished countryman, Major Greely, the Queen's Medal for this year. It was the sixth occasion on which a President of the Society had greeted the achievements of a citizen of the United States with that honour. In the year 1856, it was accorded to Dr. Kane, who had charge of the expedition generously fitted out by the Republic to search for Sir John Franklin. Dr. Kane's

journeys and discoveries and the theories he had formed, had ever since proved among the strongest incentives to further Arctic exploration. Again, in the year 1867, Sir Roderick Murchison, then occupying that chair, was able to place in the hands of the American Minister the gold medal given to another of his countrymen —namely, Dr. Hayes, who had reached a more northern point of land than any before attained. Dr. Hayes had himself been the companion of Kane, and was the discoverer of that very land named after Henry Grinnell, of New York, which had been the scene of the explorations of Major Greely. And now that they had been able to welcome back from the very gates of death the heroic officer who lately gave them an account of his work, they felt that they could give the medal to no one who had more thoroughly illustrated the precept of the services of America and Britain to place duty above every earthly consideration. The journeys of Major Greely laid down on our maps with accuracy a large portion of the physical geography of Grinnell Land. His party attained the furthest point hitherto reached to the northward, and his most interesting volumes spoke of the magnificent courage with which to the last his men backed him in carrying out the scientific observations they had been ordered to make and register. They honoured the courage of the gold medallist of this year; they recognised in him the true spirit of research, in willingness to endure any hardship for one step in the enlargement of scientific survey; and they were proud to welcome him as a brother in the labours which had been associated with the names of Markham, Nares, and M'Clintock.

The United States Minister, in reply, said he very much regretted that his gallant countryman, Major Greely, could not be present to speak for himself, for he knew how much gratification Major Greely would have had in personally receiving from the Society the very handsome and distinguished compliment paid to him, and with what satisfaction he would have listened to the kindly and considerate words by which the President had given an added value to the award. But Major Greely was far away, where his duty in the public service of his country called him, and therefore it was left to him (the United States Minister) to speak for him, not merely as a fellow-countryman, but as the representative of their country. It would be remembered that the Expedition under Major Greely was an expedition by the United States Government, and that the part taken in it by Major Greely was as an officer of that Government. The honour of the officer was indeed the honour of his country; and to any man capable of rendering such a service it must certainly be a source of the highest satisfaction that he had contributed to the honour and glory of his country. This was not the first time that England had manifested an interest in this expedition. Americans would never forget the generous offer of the *Alert*, by the British Government, to assist in the forlorn hope of the search for the remnant of the gallant band. That offer touched the sensibilities of the American heart in a way that could not be forgotten. English fleets had sailed to the West many times, sometimes on hostile errands, but when the *Alert* crossed the sea on its errand of common sympathy and common humanity in a common cause, it obscured the memory of a hundred battles. There could be few, if any, distinctions greater than such an award from a Society which was so broad and catholic in its views, so eminent for the learning and fame of its members. Any man might be proud to transmit this medal to his children and to his children's children. Time would not tarnish it, rust would not corrupt it; because the story of the heroic effort by which it had been won would not pass away with this generation like a tale that was told; it would not perish with the memory of living witnesses; it would remain on the page of history, not an insignificant chapter in the long and unbroken story of heroism and endurance, and of the spirit that placed duty above all other considerations—that genuine, solid, old Teutonic pluck that had given

to the British and to the American flags such a splendour in the eyes of all the nations of the earth. But he should poorly represent his countryman, whom the Society had once had the opportunity of welcoming here with a kindness which was felt most deeply, if he availed himself of this occasion to boast of his exploits or his fame. Those might safely be left to take care of themselves. The award of the Society, not made unadvisedly, upon any small favouritism, or in the current of any mere popular applause, was warrant enough, and need not be supported by argument. He was gratified to learn a fact he was not aware of until it was stated by the President, that on six previous occasions his countrymen had had the great honour of receiving awards from the Society. Americans might well be proud of that, and the Society might also be proud of the broad and generous impartiality that recognised merit wherever it was found. He would have great pleasure in transmitting, through the hands of his Government, the medal to Major Greely, who, when he received it, would no doubt make his acknowledgments, by letter, in a better manner than he (the United States Minister) had been able to do for him. Meanwhile, in behalf both of Major Greely and his country, he begged to return most sincere thanks.

The PRESIDENT then presented the Patron's Medal to Signor GUIDO CORA, who in reply expressed the great satisfaction with which he received the medal, which to every one devoted to geography represented the highest scientific recompense. Nothing could be more gratifying to him than to receive from this learned Society the medal which was awarded both for the most important explorations in every part of the world, and for long and fruitful research in the fields of geographical science. If it would have been his ambition to receive it at a more mature age, after accomplishing a great deal more than he had, it was still more agreeable to receive it at present, but his embarrassment was increased by finding himself in the midst of such eminent and learned men. At the same time he ought not to be so surprised at the honour, as it was a continuation of the cordial sympathy and encouragement that he had always met with in this country, which was unrivalled for the energetic impulse that it gave to all great scientific and humanitarian enterprises. Quite in the beginning of his career the distinction conferred upon him of becoming an Honorary Corresponding Member of the Society, was a powerful incentive to him to work with all his strength for the object to which he had dedicated his life, but the award of the gold medal had a still more generous significance. It confirmed what had often been said, that science knew neither political nor ethnographical bounds. In giving the Patron's Medal to an Italian the Society had once more shown that in it there was no distinction of nationality. The public approbation which the Geographical Society had given to his idea that geography was a science worthy of a place in British Universities, similar to that which it had for a long time held on the Continent, encouraged him to express the hope that reform in geographical education would shortly become an accomplished fact. Reading lately the terms used by the Council in announcing the award of the medal to him he found that they were almost identical with those used eighteen years ago, when the Founder's Medal was presented to Dr. Petermann, and he wished to take this opportunity of expressing how very grateful he was to the memory of that learned man who honoured him with his sincere and profitable friendship, and by whom he had been inspired in his topographical labours. Being now more closely connected with the Royal Geographical Society, he felt encouraged to advance with still more vigour in the path which had procured for him so great an honour. He would consider himself fortunate if at any time his labours could be of service to the Society.

The Award of the Murchison and Back Grants.

The President next read to the meeting the terms of the awards for 1886, of the above-named grants:—

The Murchison Grant to the brothers F. and A. Jardine, for their remarkable journey overland to the settlement of Somerset at Cape York (Queensland) in May 1864 to March 1865, during which they solved the question of the courses of the northern rivers emptying into the Gulf of Carpentaria and definitely ascertained the area of the York Peninsula adapted for pastoral occupation.

The Back Grant to Sergeant David L. Brainard, of the United States Army, in recognition of the effective services rendered by him during the various explorations carried out by the American Arctic Expedition of 1881–4.

No award from the Cuthbert Peek Fund had been made this year.

The names of the three Honorary Corresponding Members for 1886 elected by the Council were also read over by the President, viz. Professor J. Du Fief, General Secretary of the Belgian Geographical Society and author of a numerous series of text-books on geography; Colonel Venukoff, distinguished for his many works on various countries of Northern Asia; and Dr. Hermann Wagner, Editor of the 'Geographisches Jahrbuch,' and distinguished for the great services rendered by him to geographical education by his numerous writings on the subject.*

The Ballot for the new Council was next taken.

THE ANNUAL ADDRESS.

The President then read the Annual Address on the Progress of Geography during the past year (*vide ante*, p. 417).

On its conclusion, the Scrutineers declared the result of the Ballot to the effect that the list as recommended by the Council had been duly elected. The Council is as follows (the names of the new Members, or those who change office being in *italics*):—

President:—*The Right Hon. Lord Aberdare*, F.R.S. *Vice-Presidents*: Francis Galton, Esq., F.R.S.; General R. Strachey, R.E., F.R.S.; Sir Rutherford Alcock, K.C.B.: *The Most Hon. the Marquis of Lorne*, K.T.; Major-General Sir H. C. Rawlinson, K.C.B.; *Sir Joseph Hooker*, K.C.S.I.; C.B., F.R.S. *Treasurer*: Reginald T. Cocks, Esq. *Trustees*: *Sir Barrow H. Ellis*, K.C.S.I.; Sir John Lubbock, Bart., F.R.S. *Secretaries*: Clements R. Markham, Esq., C.B., F.R.S.; Douglas W. Freshfield, Esq. *Foreign Secretary*: Lord Arthur Russell. *Members of Council*: Sir Henry Barkly, G.C.M.G., K.C.B.; W. T. Blanford, Esq., F.R.S.; *Admiral Lindesay Brine*; *Hon. G. C. Brodrick*; *J. Annan Bryce, Esq.*; *Rev. Canon G. Butler*; Colonel Sir J. U. Bateman Champain, R.E.; Major-General A. C. Cooke, R.E.; *Colonel Sir Francis W. de Winton*, R.A., K.C.M.G.; *Colonel J. A. Grant*, C.B., F.R.S.; Major-General Sir F. J. Goldsmid, K.C.S.I., C.B.; Admiral Sir F. L. McClintock, F.R.S.;

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* The Medals for the Promotion of Geographical Education, placed by the Society at the disposal of the Syndicates respectively of the Oxford and Cambridge Local Examinations, were awarded as follows:—

1885. Oxford (June).—*Silver Medal*—Thomas Alfred Lawrenson, Liverpool. *Bronze Medal*—Alice Wilkins Wing, Truro.

Cambridge (December).—*Silver Medal*—(Physical Geography)—Henrietta F. Cann. *Silver Medal*—(Political Geography)—Minnie A. Ball.

The Prize Atlases offered for competition by the Society to the cadets of the Nautical Training Colleges, on board H.M. ships *Worcester* and *Conway*, were awarded at the geographical examinations, held in July 1885, to the following:—H.M.S. *Worcester*, to A. G. Eliot; H.M.S. *Conway*, to E. Coates.

Colin Mackenzie, Esq.; E. Delmar Morgan, Esq.; Cuthbert E. Peek, Esq., F.R.A.S.; S. W. Silver, Esq.; *Colonel C. E. Stewart*, C.M.G., C.I.E.; General Sir C. P. Beauchamp Walker, K.C.B.; Sir Thomas F. Wade, K.C.B.; Captain W. J. L. Wharton, R.N.; General J. T. Walker, C.B., F.R.S.

A vote of thanks to the retiring Members of Council, Committees, Auditors, and Scrutineers, proposed by Mr. M. BEAZELEY, C.E., seconded by Major F. G. J. PARKER, and unanimously carried, concluded the proceedings.

THE ANNIVERSARY DINNER.

The usual Annual Dinner of Fellows and their friends took place the same evening at Willis's Rooms, St. James's; the Marquis of Lorne, K.T., the retiring President, being in the chair. Among the Fellows and guests present were the following:—

His Excellency the American Minister (Mr. Phelps), Signor Guido Cora, the Sultan of Johore, Sir Henry Barkly, Sir George Bowen, Sir Thomas Wade, Sir Joseph Hooker, Sir Alexander Stewart, Sir Peter Lumsden, Sir Douglas Forsyth, Sir C. Mills, Sir A. Blyth, Sir P. Cunliffe Owen, Sir Francis de Winton, General R. Strachey, Mr. H. M. Stanley, Colonel J. A. Grant, Sir S. Davenport, Sir Rawson Rawson, Sir J. Marshall, and others.

The toasts were:—1. Her Majesty the Queen, Patron of the Society. 2. H.R.H. the Prince of Wales, Vice-Patron; H.R.H. the Duke of Edinburgh, Hon. President, and the rest of the Royal Family. 3. "The Medallists of the Year"; and 4. "Our Guests."

The CHAIRMAN, in proposing the health of "The Queen," referred to the fact that it was Her Majesty's birthday, and expressed the hope that she might be long spared to reign over a prosperous and united people. In giving "The Prince and Princess of Wales," he said the Prince of Wales would have been present had he not been obliged to attend a regimental dinner.

The CHAIRMAN then gave the health of "The Medallists." Drinking the health of Major Greely, he said, would not be an empty form, for he was sure that on behalf of the Society he might express the wish that the gallant Major's health, which had considerably suffered on account of the exertions and privations through which he had recently passed, would be speedily restored. On one occasion they had had Major Greely among them, and they were all struck with the manly and graphic account he gave of his exertions. They had the happiness to have with them that night the American Minister, who would represent his absent countryman. The whole of the scientific world was greatly indebted to the American Government and every American State Government for the publications with regard to geography and science which they were in the habit of issuing. They not only issued magnificent volumes, but they gave them freely to any one who deemed them worthy of consideration. Alluding to Signor Cora, the other medallist, the noble marquis said that ever since the union of the provinces Italy had been remarkably alive to the obligations of national enterprise. They worked in a ready way with the English, and their explorers had explored the African continent from sea to sea, from east to west. Italy was setting them a grand example in subordinating all local jealousies in her ambitions to the unity of her kingdom, an example which in the present day they might do well to follow. They honoured the works which had proceeded from the pen of Signor Cora.

The AMERICAN MINISTER (Mr. Phelps) expressed his regret that Major Greely was not present to speak for himself. The Society once had him among them, and he knew the cordial and kindly remembrance of his reception that their guest carried home with him. They had conferred upon him one of the highest distinctions that could be

conferred upon merit, in the Founder's Medal of the Royal Geographical Society. He knew that Major Greely would be proud of it, and the Americans were proud of it, as well as of the services by which it had been achieved. He hoped that it would be more and more the case, year by year, that in all the enterprises and the efforts of learning, science, charity, and humanity, these two countries, whose people were the children of a common ancestry, inheritors of a common language and common interests, and of all those great principles of civil and religious liberty which he believed were destined to surround and cover the world, would be associated together, and that every such movement and enterprise would be international in its character.

Signor CORA acknowledged the toast in Italian.

Sir H. BARKLY proposed "Our Guests, the Representatives of the Colonies." He spoke of the interest taken by the Royal Geographical Society in the Colonies and India, and said that no fewer than eleven medals had been given for exploration in Australia, five to explorers in other colonies, and eleven for geographical work in India and the adjacent territories.

Sir ALEXANDER STUART responded for Australia. The assistance given by New South Wales and other colonies in the Egyptian campaign had been given, he said, not so much with the belief that England was in danger, but merely to show that if more was wanted it would be forthcoming. He trusted the present gathering of colonial representatives would not be allowed to disperse before they came to some understanding as to the lines on which in the future the unity of the Empire might be thoroughly preserved.

The Hon. H. FABRE briefly responded for Canada.

The proceedings were shortly afterwards brought to a close.

REPORT OF THE EVENING MEETINGS, SESSION 1885–6.

Thirteenth Meeting, 7th June, 1886.—Sir RUTHERFORD ALCOCK, K.C.B., Vice-President, in the Chair.

ELECTIONS—*John Baird, Esq.*, M.P.; *William Richard Carles, Esq.* (*H.M. Consul in Corea*); *Frederick Davis, Esq.*; *Rev. Moses Harvey*; *Captain Samuel Long*, R.N.; *John Meiklejohn, Esq.*, M.D.; *Frank Russell, Esq.*; *John Cartwright Wason, Esq.*; *Robert Wilson, Esq.*, C.E.

The paper read was—

"The Congo Free State." By Colonel Sir Francis W. de Winton, R.A., K.C.M.G.

Will be published in a subsequent number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris, April 16th, 1886. M. FERDINAND DE LESSEPS, President of the Society, in the chair. This was the first General Meeting of the year, the chief business being the presentation of the various medals awarded by the Society, and the election of the members of the Bureau for 1886–7. The Chairman, in a few words, expressed his pleasure at being present again after his voyage to Panama, and then called upon M. Huber to read, on behalf of the Commission, the general report upon the prizes. According to a new arrangement this year a *résumé* only of each of the special reports upon the prizes was read at the meeting. The reports will be found *in extenso* in the quarterly Bulletin of the Society. M. d'Andrade Corvo, Plenipotentiary Minister of Portugal at Paris, received the chief gold medal of the Society, on behalf of MM. Capello and Ivens. M. de Lesseps, in presenting the medal, briefly alluded to the great journey accomplished by these two travellers across the African continent, and recalled the fact that only five years ago this same medal had been awarded to one of their compatriots, viz. Major Serpa Pinto. He also announced that the "Atheneo Commercial de Porto" had just caused a medal to be struck in commemoration of the journey. The gold medal awarded to the Pundit A—k for his explorations in Eastern Tibet, was received on his behalf by the representative of the English Ambassador. The Chairman, in making the presentation, mentioned the names of English travellers who had received prizes from the Society, and dwelt on the importance of the geographical explorations made by the Hindu Pundits under the direction of the geodetical service of India. A *résumé* of Dr. Hamy's report upon M. Marche's studies in the Philippine Islands having been read, M. de Lesseps presented the gold medal (Logerot Prize) to the traveller, referring more particularly to his study of the fauna of the islands. The silver medal of the Society was given to Captain A. Bloyet, in consideration of his surveys in Usagara, which the Chairman described as very valuable. The bronze medal, awarded to M. Charles Bayle for his Colonial Atlas, was then presented. M. de Lesseps gave a short account of his journey to the Isthmus of Panama, and the progress of the works there. In order, he said, not to be accused of being too partial to his own scheme, he would read some extracts from the account of M. G. Molinari, who accompanied him on his journey. Comparing the state of the isthmus six years ago to its condition now, he gave a graphic description of himself at the head of a party of engineers in Indian file, cutting their passage through pathless forests and wild vegetation. To-day there were, on the same ground, 1500 workmen, and machines with an aggregate of 57,000 horse-power. The general death-rate was from 14 to 15 per hundred, while the mortality on the works was 18 per 100. The hospital arrangements were excellent. M. de Lesseps was of opinion that the canal would be opened in three years. In conclusion M. Dutreuil du Rhins, one of the scrutineers of the Society, announced the result of the ballot for the members of the Bureau. The following had been elected: President, M. Ferdinand de Lesseps, of the Institute; Vice-Presidents, M. Victor Duruy, of the Institute, and Admiral Pâris, also of the Institute; Secretary, M. Charles Rabot; Scrutineers, M. Edmond Cotteau, and M. Hughes Krafft. With regard to the quinquennial election for the Central Commission, all the retiring members had been re-elected.

——— May 7th, 1886: M. A. GERMAIN in the Chair.—The Geographical Society of Marseilles announced the death of its founder and president, M. Alfred Rabaud, who died on 12th April; an obituary notice of the deceased would be found in the next bulletin of that Society.—The Chairman also announced the

death of M. Gustave d'Eichthal, who had been a member of the Society for nearly fifty years, and of M. Boyer, civil engineer, who had recently gone out to the Isthmus of Panama and had succumbed to the unhealthiness of the climate.—The Commercial Geographical Society of Nantes intimated that the eighth meeting of the National Congress of the French Geographical Societies would be held in that town on the 4th August instead of the 8th as originally fixed.—Among the works presented to the Society, the Librarian specified the following:—The official reports of M. O. S. Storin (from Buenos Ayres) upon his expeditions along the Upper Parana to Y-Quazú and the Pilcomayo, with corresponding maps, and M. Riedel's work on the races of New Guinea, with geographical notes and statistics.—A letter was read from M. Panagiotes Potagos, dated 20th April from Corfu, stating that he had made a complete study of the geography of Epirus and Thessaly, and that he was preparing an exhaustive work embodying the results of his observations. The general Secretary *à propos* of this letter, referred to the former journeys of the traveller, viz. to the Niam-Niam country (Africa), and across the continent of Asia, and stated that in a few months M. Potagos would publish an account of these two great journeys.—Lieutenant Gouin, French Resident at Nam-Dinh (Tong-king) transmitted some geographical notes on the country, which will be found in the quarterly Bulletin of the Society. Accompanying these notes was a letter (3rd March, 1886) giving an account of a short journey into the country in the neighbourhood of the Delta inhabited by the Muong. He penetrated in a junk as far as Ninh-Cuong, the residence of the royal family of Lauh-Xieh, whose son gave him a cordial reception. M. Gouin states he has collected some interesting documents giving information about these people.—M. de Bizemont communicated a paper by Lieutenant Baudens, on Tong-king, and M. R. du Caillaud also sent a note regarding the boundaries of Tong-king on the frontier of Yunnan.—General E. Philebert forwarded a copy of the itinerary followed by his column during the Tunisian expedition, in the course of which the district of Djebel-Duirats, hitherto unexplored, was traversed.—A letter dated 3rd March was read from M. Cope Whitehouse, with regard to his investigations in the vicinity of the Fayum.—M. R. du Caillaud communicated a short note on a journey accomplished by M. Duparquet, of the Pères du Saint-Esprit mission, along the plateau of Amboella (South Africa).—The Secretary read a letter addressed to M. de Lesseps by Vicomte T. de Brettes, submitting proposal for names to be given to the large salt lake and the three rivers discovered by him in the interior of Southern Gran Chaco. He proposes to name them as follows:—Lake Crevaux, Rio Roca (after the President of the Argentine Republic), Rio de Lesseps, and Rio de Brettes.—M. Vidal Gormaz, of the hydrographical service of Chili, transmitted from Santiago some information regarding the geographical co-ordinates of Valparaiso.—M. E. Hangsen-Blangsted wrote again upon the subject of the maps carved on wood brought back from Greenland. He is still of opinion that they are the work of some of the members of the Lilloise expedition.—The Chairman presented on behalf of the author a copy of an exhaustive and interesting paper by Admiral Cloué on the hurricane which took place in June, 1885, in the Gulf of Aden. He suggests that, in order to avoid a recurrence of such enormous destruction, a complete system of telegraph stations should be organised on both sides of the Gulf, starting from Socotra.—M. Jules Giraud, the Assistant Secretary, laid on the table a work entitled 'Recherches sur l'instabilité des continents et du niveau des mers,' which deals with the alternative theories of upheaval and depression as explaining the present condition of the earth's surface.—M. Antoine d'Abbadie, of the Institute, communicated a letter, dated 6th April, from M. Jules Borelli, giving some account of his journey in Ethiopia.—Two papers were read, one by M. Erslev upon the ancient maps of

Denmark, and the other by M. Opiqez on New Caledonia, both of which will be found in the quarterly Bulletin of the Society.—In conclusion, M. Bouquet de la Grye, the Secretary of the Commission appointed by the Society to consider the question of the orthography of geographical names, gave a *résumé* of the report of the Commission, which will be printed *in extenso* in the quarterly Bulletin.

German Geographical Congress.—The sixth conference of German geographers was held at Dresden from 28th to 30th April last. The proceedings were similar to those of former years, but the attendance showed a considerable falling off, the numbers being 333 as against 633 at Hamburg last year. The decrease is, however, attributed to local influences and to the fact that the general meeting of the German Colonial Society was being held at the same time. The first day's sitting of the Congress was occupied with papers by Lieutenant von François upon his journeys in the southern part of the Congo basin, and also upon Lieutenant Wissmann's explorations on the Kassai and his journey, accomplished in company with the Rev. G. Grenfell, along the Chuapa and the Lulongo. The author maintained that a European colony could be established in the south central basin of the Congo, where, he said, it was possible for Europeans to work out in the open for four or five hours on sunny days. Dr. E. Naumann gave an account of his extensive journeys in Japan, and Dr. E. Petri read a paper calling attention to the importance and necessity of further explorations in Siberia. Among other subjects discussed was the question of the importance of drawing in geographical education, which gave rise to a long debate. Herr Matzat advocated that the position of isolated places should be determined, not by degrees of latitude and longitude, but by their ascertained distance from some town of importance, and that in the representation of mountains on maps, not only their position and direction should be shown, but also their elevation and slope in the simplest manner possible. Drs. Regel and Krosta also spoke as to the importance of the results obtained by pupils filling up blank maps. A general desire was expressed by many teachers interested in the conference, that more time should be devoted to the discussion of questions relating to geographical education in schools and colleges. Of special interest was Dr. O. Schneider's large and varied collection of geographical objects for use in schools, which included specimens of natural products and of the industries of various parts of the globe, together with photographs of ethnological types and of the characteristic formations of various countries. Among the other exhibitions the following may be mentioned:—Dr. A. Stübel's collection of objects illustrating his expedition of ten years in Ecuador, Dr. Naumann's interesting collection from Japan, and the exhibition of ancient and modern maps by the Government of Saxony.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Baddeley, M. J. B.—Orkney and Shetland, with approaches from Edinburgh, Thurso, and the Western Islands. London, Dulau & Co., 1886: 8vo., pp. viii. and 62.

Orkney and Shetland afford the most complete change which any tourist can obtain within the limits of our islands. There is much that is attractive in their treeless scenery, and they have many features of historical, antiquarian and geological interest. There are a few local guides to these islands, and several

large works full of varied detail. Mr. Baddeley's new guide contains all information essential to the ordinary tourist. It is trustworthy so far as we have tested it, and contains nine good maps, by Bartholomew, on scales varying from 2 to 28 miles to an inch. [Presented by the Publishers.]

illson, Thomas B.—The Handy Guide to Norway. With maps, and an appendix on the Flora and Lepidoptera of Norway by R. C. R. Jordan, M.D. London, Stanford, 1886: 8vo., pp. viii. and 183. Price 5*s*. [Presented by the Publishers.]

The convenient pocket size of this guide is a recommendation. It does not pretend to be exhaustive, but it contains accurate information of all the principal and many of the minor tourist routes through Norway. Full information is given as to route, hotels, post stations, &c. Most of the tours described are through districts which have been personally visited by the author, or have been compiled from information specially collected by friends for the work. A great part of the work has, moreover, been revised on the spot. A valuable feature is the number of maps; besides a general index map, there are six sectional maps.

ASIA.

Henry, B. C.—Ling-Nam, or, Interior Views of Southern China, including explorations in the hitherto untraversed Island of Hainan. London, S. W. Partridge and Co., 1886: 8vo., pp. 511, maps and illustrations. Price 6*s*. [Presented by the Publishers.]

This work is a valuable contribution to our knowledge of the little-known interior of southern China. It contains descriptions of the various places visited by the Author during his journeys, which were made in all directions in this portion of the empire: including, in many instances, the population, nature of the country, the people, products, &c. Among the places described may be mentioned the delta of the Pearl River; Tengoo and the marble caves; the Bamboo River; the North River; the Lien-chow River and Town, including a description of the Iu people; Tan-ha, or the Red Cloud Mountain; and the Loh-fow Mountains, which are situated about sixty miles east of Canton. The main mountain Loh-fow measures about thirty miles round the base, and rises to a height of 3500 feet. About one-third of the volume is occupied by an interesting description of the island of Hainan, including the author's journeys through the interior in October and November 1882, together with his observations on the country traversed, the places visited, the aborigines of Hainan, their manners and customs, trade, &c. The maps, three in number, viz. Central Canton, Northern Canton, and the island of Hainan, have been prepared from the author's MS. notes, and, with a few exceptions, the illustrations are *fac-simile* reproductions of ink sketches taken by a native artist.

Müller, F. Max.—The Sacred Books of the East. Vols. xxvi., xxvii., and xxviii. Oxford, Clarendon Press, 1885: 8vo., pp. (xxvi.) xxxii. and 480; (xxvii.) xiv. and 484; (xxviii.) viii. and 496. [Presented by the Secretary of State for India.]

AMERICA.

[Alaska.]—Report of the Cruise of the U.S. Revenue steamer *Thomas Corwin* in the Arctic Ocean, 1881. By Captain C. L. Hooper, U.S.R.M., Commanding. Washington, Government Printing Office, 1884: 4to., pp. 147.

Report of the International Expedition to Point Barrow, Alaska. [Lieut. P. H. Ray, U.S. Infantry, Commanding.] Washington, Government Printing Office, 1885: 4to., pp. 695. [These two presented by the U.S. Government.]

Alaska: its Southern Coast and the Sitkan Archipelago. By E. Ruhamah Scidmore. Boston, Lothrop & Co. [1885]: 8vo., pp. [x.] and 333. [Presented by the Authoress.]

Along Alaska's Great River. A popular Account of the travels of the Alaska Exploring Expedition of 1883, along the Great Yukon river, from its source to its mouth, in the British North-west Territory, and in the territory of Alaska. By Friedrich Schwatka. New York, Cassell & Co. [1885]: 8vo., pp. 360.

There has been a superabundance of recent literature on Alaska, and the works mentioned above add very considerably to our knowledge of a region of great geographical and scientific interest. To some of the results of the cruise of the *Corwin* we have already referred (Proc., N.S., vol. v. p. 746.) In the present volume we have the general narrative of the cruise along the coasts and among the islands of the approaching coasts of America and Asia. The volume abounds with information of scientific value on the natives, their habits, implements, &c.; the meteorology of the region; Arctic ice; natural history, especially reindeer, and other matters. The information is not so well arranged as it might have been, and there are neither contents nor index. There is no chart, but many photographic illustrations.

Lieutenant Ray's expedition to Point Barrow, Alaska, formed one of the International Polar observing parties. It was stationed at Point Barrow, Alaska, 71° 23′ N. lat., 156° 40′ W. long., during the years 1881–2–3. Of course, according to instructions, Lieutenant Ray's main mission was to carry out the system of observations agreed on by the International Polar Committee. The results of these observations on meteorology, magnetism, tides, earth currents, &c., occupy a very large portion of the stout quarto volume. But the volume contains much more. The contribution to the topographical geography of the region is certainly not great, though the coast-line has been mapped more carefully, and short excursions were made into the interior. The section devoted to the natives is valuable; they do not conform to the ideal type of the Eskimo. Lieut. Ray speaks in high terms of these natives, about whose customs, mode of life, social polity, superstitions, folk-lore, &c., he gives many interesting details. These are accompanied by numerous photographic illustrations, vocabularies, &c. A considerable section is devoted to natural history, which is followed by meteorology and other subjects proper to the special work of the expedition.

Mrs. Scidmore's work is a popular one of a good type. It largely describes her own visits to Alaska, and the results of her own observations, combining additional information gathered from trustworthy sources. She speaks with something like enthusiasm of a region which, considering its vast extent—three times the size of California—must have considerable variety of climate. The scenery is certainly varied and magnificent, and Mrs. Scidmore's work will probably attract many travellers. The chapters originally appeared to a large extent as letters in various American journals. There are numerous illustrations, and a reduced copy of Mr. Dall's map.

Mr. Schwatka's book is a narrative of a very creditable piece of exploration executed by himself and companions in 1883. In April of that year the expedition was organised with seven members at Vancouver barracks, Washington Territory, and left Portland, Oregon, in May, ascending the inland passage to Alaska as far as the Chilka country. Crossing the Alaska coast range of mountains to the head waters of the Yukon, the party there constructed a raft. On this primitive craft, sailing through nearly 150 miles of lakes, and shooting a number of rapids, the party floated along the great stream for over 1300 miles, the largest raft journey ever made in the interests of geographical knowledge. The entire river, over 2000 miles, was surveyed, the party returning home by Behring Straits, and touching at the Aleutian Islands. There are very many well-executed and instructive illustrations, and a map, in three sections, of the river, on the scale of 35 miles to an inch.

[**America, United States.**]—Annual Report of the Chief of Engineers, United States Army, to the Secretary of War, for the year 1885. In four parts. Washington, Government Printing Office, 1885: 8vo., charts, plans, &c. [Presented by the Engineer Department, U.S. Army.]

[America, U.S. Coast and Geodetic Survey.]—Report of the Superintendent of the U.S. Coast and Geodetic Survey, showing the progress of the work during the Fiscal year ending with June, 1884. Part I.—Text. Part II.—Sketches. Washington, Government Printing Office, 1885: 4to., pp. xxviii. and 621. [Presented by the Superintendent of the U.S. Coast and Geodetic Survey.]

Proceedings of the Association of Dominion Land Surveyors at its Third Annual Meeting, held at Ottawa, February 16 and 17, '86. Ottawa, 'Evening Journal' Print, 1886: 8vo., pp. 22, chart.

GENERAL.

[Cruise of the 'Bacchante.']—The Cruise of Her Majesty's ship 'Bacchante' 1879–1882. Compiled from the private journals, letters, and note-books of Prince Albert Victor and Prince George of Wales, with additions by John N. Dalton. 8vo. Vol. i., The West and the South, pp. xxviii. and 675. Vol. ii., pp. xii. and 803. London, Macmillan & Co., 1886. Price 52*s.* 6*d.* [Presented by the publishers.]

This is the record of a royal lesson in geography. The method is one which might be universally adopted with advantage, though few but princes can afford it on so large a scale as was the cruise of the *Bacchante;* it is indeed a world-wide extension of the method of *Heimatskunde.* The cruise of which this is the ample record, lasted from September 1879 to August 1882, during which the *Bacchante* traversed nearly 60,000 miles. The first section of the cruise, extending to May 1880, included visits to Gibraltar and the Mediterranean, Madeira, the Canaries, West Indies, and Bermudas. After a brief visit to Vigo, the second and much longer part of the cruise was begun in August 1880, and included all our great colonies, except Canada. India also was left out; that great country would require a special visit itself. By Ferrol, Madeira, and the Cape Verde Islands, the River Plate was made, and some time was spent visiting portions of Uruguay and the Argentine Republic. Thence the *Bacchante* made for the Falkland Islands, where preparations were being made for a short stay, when orders were received to proceed at once to the Cape to "demonstrate." The *Bacchante* idled about the Cape for several weeks, during which time the Princes had ample opportunity of visiting various parts of the colony, and becoming familiar with its geographical, social, and industrial conditions. From the Cape a beeline almost was made for Australia. The passage was of the most tempestuous and dangerous character during nearly the whole time, and the *Bacchante's* rudder went wrong, placing her in a state of the greatest danger. Happily, she managed to get safely into King George's Sound, where some time was spent getting the ship into repair. This gave the Princes an opportunity of becoming familiar with a portion at least of West Australia. Here they thoroughly enjoyed themselves, hunting kangaroos, and riding about the country, making many acquaintances among the colonists. South Australia, Victoria, New South Wales, and Queensland were in turn visited by the Princes, who spent a considerable time in each, busy every day with some function or expedition. They left Australia, it is evident from their volumes, with a very full knowledge of its various conditions, social, political, industrial, and geographical. After a pleasant visit to the Fiji Islands, the *Bacchante* made a direct run for Japan, where the Princes spent some time seeing many of the places and things in that curious country, under the most favourable guidance. Shanghai, Canton, and the Straits Settlements were in turn touched at, and a much longer stay was made in Ceylon, the wonderful vegetation of which, and its magnificent architectural remains, greatly interested the Princes. Running up the Red Sea, Egypt was reached, and here and in Palestine the Princes spent three months, busy all the time exploring and studying the antiquities and the geography of these two greatly interesting regions. This they did under such guidance as that of Sir Charles Wilson and Captain Conder, and so were able to learn much which the ordinary visitor would miss. Indeed, the record of this visit is of some original value, and is quite worth studying by those desirous of knowing something of

Egyptology and modern research in the Holy Land. After touching at various places in the Mediterranean, the *Bacchante* made for home, reaching the Isle of Wight in August 1882.

The book divides itself into two sections. The contribution of the Princes consists of their diaries, note-books, and letters, "edited" by Canon Dalton. The Canon himself contributes very largely to the work, his sections being included in square brackets. The Princes give the daily incidents of the voyage, incidents of life on board a ship-of-war, records of their visits to the various countries at which they landed, information partly gleaned from their own observation, and partly the result of their reading, with occasional reflections on what they saw and heard. Canon Dalton gathers together a vast deal of geographical, historical, industrial, and political information into his sections, giving the views of various parties on colonial questions of present interest. The work is thus one of solid value, abounding with useful information on the countries visited, and especially on our colonies. The cruise must have been of the greatest benefit to the Princes themselves in many ways. There are many illustrations in the work; one rather small chart of the world, showing the route, and various small sectional charts drawn by the Princes themselves.

Milne, John.—Earthquakes, and other Earth Movements. London, Kegan Paul & Co., 1886: 8vo., pp. xiv. and 363. Price 5*s*.

Professor Milne is well known as one of the greatest living authorities on those movements of the earth which often so seriously affect the topography of wide areas. Japan is probably the most notorious earthquake country in the world, and Professor Milne and his colleagues have taken advantage of their residence there to study their phenomena minutely, and to devise apparatus adapted to record results with accuracy. In this volume, then, we have a scientific exposition of all that is at present known of the subject. After an introductory chapter, Professor Milne treats of seismometry and its various instruments; of earthquake motion (1) theoretically, (2) deduced from experiments, (3) deduced from observations on earthquakes. Then there are chapters on the effects of earthquakes on buildings; on land; on the ocean; earthquake origins; distribution of earthquakes in space and time; barometrical and thermometrical fluctuations and earthquakes; relation of seismic to volcanic phenomena; causes of earthquakes; prediction of earthquakes; earth tremors; earth pulsations; earth oscillations. The book will probably take its place as a standard authority on the subject. There is a map of the world showing seismic and volcanic areas.

[The 'Challenger' Voyage.]—Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873–76, under the command of Captain George S. Nares, R.N., F.R.S., and the late Captain Frank Tourle Thomson, R.N. Prepared under the superintendence of the late Sir C. Wyville Thomson, Knt., F.R.S., &c., and now of John Murray, one of the Naturalists of the Expedition. Zoology—Vol. xiv. London, Longmans & Co., &c., 1886: 4to., pp. 432 and 290. Price 42*s*. [Presented by the Lords Commissioners of Her Majesty's Treasury.]

The contents of this volume are:—I. Report on the Tunicata collected during the voyage of H.M.S. Challenger, during the years 1873–1876. Part II.—Ascidiæ Compositæ. By William A. Herdman, D.Sc. &c. With one chart and 49 pates. II. Report on the Holothurioidea dredged by H.M.S. Challenger, during the years 1873–1876. Part II. By Hjalmar Théel. With 16 plates.

The following works have also been added to the Library:—

Jahrbuch des Norwegischen Meteorologischen Instituts für 1882, 1883, 1884. Herausgegeben von Dr. H. Mohn. Christiania, Grøndahl & Søn, 1883, 1885: folio, pp. (1882) vi., 99 and 8; (1883) v., 99 and 6; (1884) xiv., 100 and 8.

Cowan, Frank.—The City of the Royal Palm, and other Poems. Rio de Janeiro, A. J. Lamoureux & Co., 1884: 8vo., pp. 49.

——— A Visit in Verse. Halemaumau. Honolulu, P.C. Advertiser Steam Print, 1885: 8vo., pp. 21.

——— Fact and Fancy in New Zealand. The Terraces of Rotomahana: a Poem. To which is prefixed a paper on Geyser Eruptions and Terrace Formations, by Josiah Martin, F.G.S. Auckland, N.Z., H. Brett, 1885: 8vo., pp. 61.

——— Australia: a Charcoal Sketch. Greensburg, Pa., "The Press" Printing House, 1886: 8vo., pp. 40.

[The above four pamphlets were presented by the Author.]

Kips' Guide to Brussels (Bruxelles): containing a Route Map, Plan of Brussels, and Environs of Brussels, compiled and published by Joseph Kips, F.R.G.S. Brussels, H. Van Havermaet: 16mo., pp. 107. [Presented by Joseph Kips, Esq.]

Seeley, H. G.—The Fresh-water Fishes of Europe. A History of their Genera, Species, Structure, Habits, and Distribution. With 214 illustrations. London, &c., Cassell & Co., 1886: large 8vo., pp. x. and 444. Price 21*s*. [Presented by the Publishers.]

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Deutschen Reiches.—Karte des ——. Scale 1: 100,000 or 1·3 geographical miles to an inch. Sheets: 184, Neu-Strelitz. 520. Rybnik. 572. Landau i. d. Rheinpf. 537. Ruptau. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1886. Price 1*s*. 6*d*. each sheet. (*Dulau.*)

Ireland.—The Tourist's Map of ——, by John Bartholomew, F.R.G.S. From the Ordnance Survey. Scale 1: 645,000 or 8·8 geographical miles to an inch. Dublin, Charles Eason & Sons; Edinburgh, J. Bartholomew. Price 1*s*.

In this map all railways and main roads are laid down; it is clearly drawn, but the scale is too small for anything but general reference, or to indicate the means of communication between one part of the country and another.

Scotland.—Reduced Ordnance Maps of ——, by John Bartholomew, F.R.G.S. County of Dumfries—County of Kirkcudbright—Wigtown and Stranbaer District. Scale 1: 126,290 or 1·73 geographical miles to an inch. Edinburgh, A. & C. Black. Price 2*s*. 6*d*. each.

These are additions to the useful series of reductions from the Ordnance Survey which are being made by Mr. John Bartholomew, and published by Messrs. Black of Edinburgh. The scale on which these maps are drawn is sufficiently large for purposes of reference, and thus they are likely to prove of great use to tourists.

Sverige.—Generalstabens karta öfver ——. Scale 1: 100,000 or 1·3 geographical miles to an inch. Sheets:—34. Ulricehamn. 36. Vimmerby. Stockholm, 1885. (*Dulau.*)

ORDNANCE SURVEY MAPS.

6-inch—County Maps:—

England and Wales: **Brecknockshire**: 37 N.E., 39 N.E., 40 S.W.; 1*s*. each. **Cambridgeshire**: 31 S.E., 54 N.W., 59 N.E., S.W., S.E.; 1*s*. each. **Cardiganshire**: 8 S.E., 12 N.E., 13 S.W.; 1*s*. each. **Carmarthenshire**: 43 N.E.; 1*s*. **Devonshire**: 52 N.W., 108 S.E., 114 N.W.; 1*s*. each. **Dorsetshire**: 3 N.W., S.W., 5 N.E.; 1*s*. each. **Gloucestershire**: 40 N.W., N.E., S.E.; 1*s*. each. **Herefordshire**: 12 S.E., 28 N.E.; 1*s*. each. **Lincolnshire**: 5 S.E., 35 S.W., 36 N.E., S.E., 114 S.W.; 1*s*. each. **Merionethshire**: 16 S.W.; 1*s*. **Montgomeryshire**: 5 S.W., 8 N.W., N.E., S.W., S.E., 46 S.E., 50 N.E., 62 N.E.; 1*s*. each. **Northamptonshire**: 3 S.W., S.E., 8 S.W., 39 N.E.; 1*s*. each. **Nottingham-**

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25-inch—Parish Maps:—

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Town Plans—10-feet scale:—

England and Wales: Chippenham, XX. **14.** 8, 9, 13, 14, 17, 18, 19, 21, 22, 23, 24; XXVI. **2.** 8, 14, 2*s.* each. Swindon, XV. **3.** 14, 15, 19, 20, 24, 25; XV. **4.** 11, 12, 16, 17, 21, 22; XV. **7.** 5, 10, 15; XV. **8.** 1, 2, 6, 7, 8, 11, 12, 13, 16, 17, 18, 22, 23; 2*s.* each. Weston Super Mare, IX. **15.** 2, 4, 10; IX. **16.** 21, 22; XVI. **3.** 9; XVI. **4.** 2, 2*s.* each. Worcester, XXXIII. **4.** 21, 2*s.*

(*Stanford, Agent.*)

ASIA.

Babylon.—Surveys of Ancient ——, and the surrounding ruins, with part of the Rivers Tigris and Euphrates, the Hindiyeh Canal, the Sea of Nejf and the Shat Atshar, made by order of the Government of India in 1860 to 1865 by Commander W. Beaumont Selby, Lieut. W. Collingwood and Lieut. J. B. Bewsher, officers of Her Majesty's Indian Navy on Surveying Service. The Nahrwan, Yusufiyeh, &c. added from surveys by Captain J. Felix Jones, I.N. Compiled by order of H.M. Secretary of State for India in Council, by Trelawney Saunders, F.R.G.S., Geographical Assistant, India Office. Scale 1:148,920 or 2·04 geographical miles to an inch. London, published by W. H. Allen & Co., Edward Stanford, Trübner & Co., 1885.

In this map, the compilation of which is the work of Mr. Trelawney Saunders, a complete view of the Babylonian surveys, thus far executed by the Government of India, is given. It brings under notice many heaps of ruins that are identified with ancient cities of great historic interest, and a far greater number of similar shapeless masses, each of considerable extent, but which continue unidentified and have yet to attract the labours of learned excavators, through whom alone their secret history may be brought to light. The copy which has been presented to the Society is coloured in such a manner as to

give more distinctness to the features of the surface than the plain copies afford. The unsurveyed tracts are left plain; uncultivated desert parts are in light brown; prominent mounds and ruins are in dark brown; swamps, marshes, and rice grounds flooded by the Euphrates in pale green; cultivated grounds, gardens, groves, brushwood, and pasture are dark green.

The following pictures are added to the map:—The Tak Kesra at Ctesiphon. Baghdad, from the west bank of the Tigris. The Sûk el Ghuzl, the highest minaret in Baghdad. Nejmi, a ruin on the old Shat-el-Nil. Zibbleyeh, a high tower in ruins. Niffer, ancient Nippur, mounds of ruins. Dewăniyeh, a town on the Euphrates. Tel-Ibrahim, a mound of ruins abounding with cuneiform inscriptions. Birs Nimrud, the site of Borsippa. The Kasr-Babel from the same point of view. Kifle, on the Hindiyeh, with the tomb of the Prophet Ezekiel. O-om'l Garoof, a cliff on the sea of Nejf. Nejf, or Meshed Ali, the reputed burial-place of the Kaliph Ali. Sherai-el-Kathi, a ruin on the sea of Nejf.

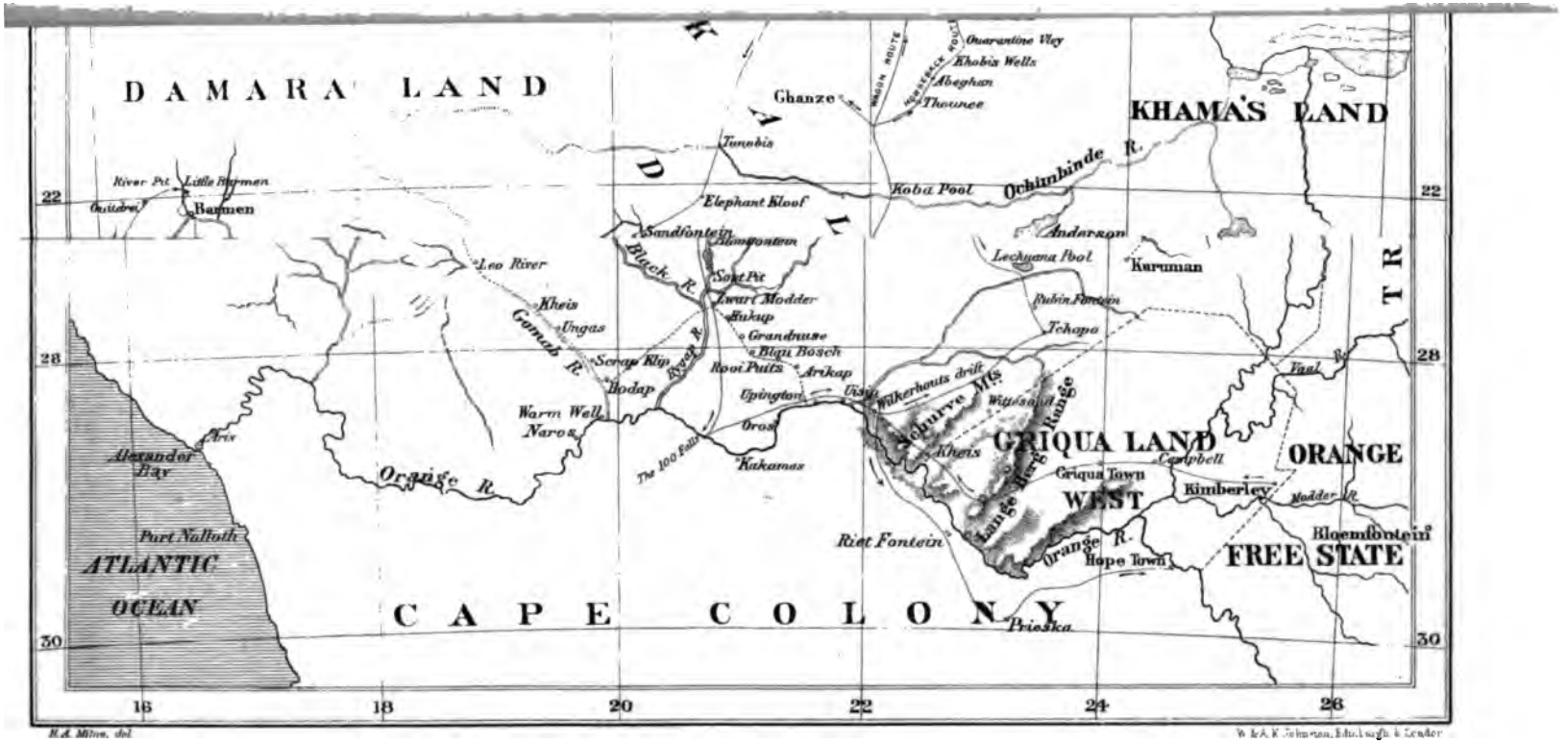
ATLASES.

Oesterreich-Ungarn.—Physikalisch-Statistischer Hand-Atlas von ——— in 24 Karten mit erläuterndem Text unter Mitwirkung von Vincenz v. Haardt, Prof. Dr. Anton Kerner Ritter v. Marilaun, Ministerialrath Dr. J. Lorenz Ritter v. Liburnau, Dr. Franz Ritter v. Le Monnier, General-Major Carl Sonklar v. Instätten, Prof. Dr. Franz Toula, herausgegeben von Dr. Josef Chavanne und ausgeführt in Eduard Hölzel's Geographischem Institute. VII. Lieferung. Inhalt: Nr. 15, Karte der Vertheilung der Bevölkerung Oesterreich-Ungarns nach der Umgangs-, bezw. Muttersprache. Nr. 22, Karte des Verhältnisses vom Ackerland, Waldland, Wiesenland und Weinland zur Gesammtfläche. Nr. 23, Karte der Vertheilung des Grossviehes auf die Fläche. Wien, Eduard Hölzel, 1886. Price 7*s*. (*Dulau.*)

As usual, this issue of the Austro-Hungarian Physical Statistical Hand-Atlas contains several pages of explanatory letterpress. The ethnological map, which is based on the results of the census of December 31st, 1880, is particularly worthy of notice; it not only indicates by a system of colouring the distribution of nationalities in the districts, but also shows the proportions of each, resident in all the principal cities and towns. A small diagram is given illustrating the principle on which this series of symbols is arranged, and taking Vienna as an example, it represents the whole population by the area of a circle, which is divided by radii into segments, each of which represents the proportion which the number of residents of any one nationality bear to any other, or to the whole population of the city; the four principal ethnological divisions given being those of the German, North Sclavonic, South Sclavonic, and Latin races. The four maps that follow exhibit at a glance the areas under cultivation, those reserved as meadow land, the extent of the forests, and the proportions in which viticulture is carried on in the different parts of the empire. The present issue concludes with a set of maps illustrating the distribution of horses, goats, cattle, and sheep.

World.—The Pocket Atlas of the ———. A comprehensive and popular series of maps illustrating Physical and Political Geography. By John Bartholomew, F.R.G.S., with Geographical Statistical Notes. London, John Walker & Co., 1886.

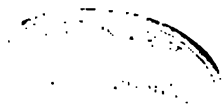
This little atlas, containing nineteen pages of statistical letterpress, and fifty-four maps, measures only five inches in length, a little more than three inches in breadth, and is less than three-quarters of an inch thick, it therefore is really what its title indicates, an atlas that can be carried in the pocket; but though it is very nicely got up, and contains a large amount of information for so small a volume, it is difficult to conceive what want it supplies, as the scales on which the maps are produced are so small that nothing more than a very general idea of the geography of each country can be given, and there are but few people who are, at one and the same time, such ardent students of geography as to wish to carry an atlas in their pockets, and so ignorant of their favourite science as to require such aids as this little atlas could afford.



H.A. Milton. del.

W. & A.K. Johnston, Edinburgh & London

Pub^d for the Proceedings of the Royal Geographical Society 1886.



PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Burma: the Country and People.

By J. Annan Bryce.

(Read at the Evening Meeting, March 22nd, 1886.)

Map, p. 514.

In the paper which I am to have the honour of reading to you to-night, I propose to give some description of what I think will have the principal interest for the members of this Society—the physical aspects and the inhabitants of Burma. As I gave a fortnight ago before the Royal Colonial Institute a description, which some of you may have heard or read, of its commercial and political aspects, with details of its productions and trade, it will be needless for me to touch on those subjects this evening.

The character of a country is most easily understood by beginning with a consideration of its mountain structure. If you look at the map, you will see that the great peninsula between the Bay of Bengal and the China Sea, known by the general name of Indo-China, differs in its conformation from India proper in this remarkable respect, that its mountain ranges all run north and south, while those of India run east and west. The map will show you further that these ranges, which have a very considerable, though not great, average elevation, say from 3000 to 5000 feet, are separated by valleys of no great width, and that the principal chains have their roots at the south-eastern extremity of the great Tibetan plateau. Now these physical features have important results. The north and south strike of the ranges, opening out a little towards the south, permits the mouths of the valleys where the rich delta land lies to receive the full force of the rain-bearing south-west monsoon, which passes obliquely up to the north-east. The elevation of the mountain ranges, while sufficient to secure the condensation of the monsoon clouds, is not great enough, as is the case with the Himalayas, to impede the passage of those clouds. The highlands, therefore, all over this region have an abundant supply of rain, which gives birth

to a number of great rivers, the Irawadi, the Sittang, the Salween, the Mehkong, and the Mehnam. The direction and length of the mountain chains have determined the course and size of these rivers, of which all except the Salween, which flows during the whole of its long course in a very narrow valley, and has therefore a comparatively small drainage, bring down annually vast supplies of fertile alluvium, forming rich plains during their course, and great deltas at their mouths.

I have said that the deltas at the mouths of these valleys receive the full force of the south-west monsoon, and enjoy therefore an abundant rainfall. Their upper parts, however, have to depend for their water-supply mostly upon the inundations of the rivers, which are fed by the abundant rainfall of the mountains. You will see from the map that the south-west clouds, before they reach the upper valleys, have to pass over one or more of the ranges. Now when clouds laden with rain pass over a range of hills which is able to condense them, they are in the habit of depositing the bulk of the moisture with which they part at that particular time on the side nearest the direction from which they come. Furthermore, if there be any considerable space at a much lower level between the ranges, the clouds will often pass over from one to the other without depositing any rain to speak of on the intermediate plain, and again condense on the range to leeward. Over all this region, therefore, you find that the plains of the upper valleys have much less rain than the mountains which bound them, and that the eastern sides of the ranges and the adjoining part of the plain have less rain than the western sides, and consequently that the streams fed from the eastern side are smaller.

The number of forest-covered ranges, and the comparative narrowness of the valleys, prevent the development of hot winds such as are the scourge of the plains of India, and render the climate generally more equable than in the corresponding latitudes of that country. Nor is the country more unhealthy than the similarly situated regions of India, though fever is of course rife in the forests. The north and south lie of the mountain chains and of the intervening valleys has determined also the history of these regions. All the tribes which have successively occupied them have come down the valleys from the north, while the immigrants who brought, or at least reintroduced, the existing religion, literature, and civilisation, came by sea from the opposite coasts of India and landed in the south.

Such being the general configuration of this region, let us now turn to that part of it which is the particular subject of our consideration.

The country known by the generic name of Burma, including in that title both the old British provinces and Upper Burma, our latest acquisition, has an area of about 230,000 square miles, an area that is, about twice as large as that of the United Kingdom, of which the old provinces contain about 90,000, and Upper Burma about 140,000. The

river *par excellence* of Burma is the Irawadi. This great stream, which is navigable by steamers drawing five feet of water as far as Bhamo, 900 miles from its mouth, and its largest tributary the Kyendwin, form in Upper Burma several fertile plains, producing rice, cotton, wheat, and other valuable crops, while in the lower part of its course, in conjunction with the river Sittang, it forms a splendid delta, which is the main source of the world's supply of rice. The vast expanse of delta, nearly 100 miles each way, appears, indeed, one immense rice-field, stretching away illimitably, level as the sea. The aspect of this plain is changeful. In midsummer, after the first heavy rains, an unbroken sheet of water, it becomes carpeted, as the rice plant grows, with brightest green, which turns, ere December arrives, to waving gold, and then, after harvest, to a dreary grey flat of sun-baked mud, over which the smoke of the burning stubble hangs like a pall. Out of it rise, visible to great distances, the mighty masses of the great pagodas of Rangoon and Pegu, as changeful in their golden sheen of light, and yet as unchanging, as the wide plain over which they have looked for so many centuries.

Though the delta thus seems one vast rice-field, by no means all of it is under cultivation. Much is still uncleared jungle, and in parts, especially on the Sittang side, are great tracts of waste land, roamed over by deer and tiger, and of savannah covered with a thick growth of lofty elephant grass. It is estimated that only about one-seventh of the cultivable land of Lower Burma is actually cultivated, but as the country is opened up by roads and railways, more and more of this land is being brought under tillage, and already within a year after the opening of the Sittang Valley line, these wastes are being broken up by the plough.

All this delta country, exposed to the full force of the south-west monsoon, has in the summer an abundant rainfall, as much as 100 inches in the southern part, but as one journeys north the country becomes drier till at the apex of it, about 170 miles from the sea, the rainfall is about one-half. About this point the ranges bounding the valley send out spurs, which again retire, leaving rich plain country on both sides, though on the left bank a low arid ridge intercepts the view of it, while to the west the eye ranges as far as the Arakan chain. In the plain country of the Upper Irawadi, as I have already said, there is but a small rainfall. This region, therefore, depends very largely for its water supply on the rises of the Irawadi and its tributaries, which are as much as 40 or 50 feet in height, and spread widely over the country, so that the course of the Irawadi and the Kyendwin present in places during the rains, the appearance of a great lake nine or ten miles in width. When the river falls, vast expanses of sand and mud are left exposed, and the stream narrows to a comparatively small volume, winding in devious channels among the sandbanks. In the spring

months, when the strong southerly wind, the precursor of the monsoon, sets in, it raises clouds of sand, which, under the bright sunlight, overspread the horizon with a yellow glare. All around, the thorny vegetation of this dry region looks at this season bare and arid. Even the forest-covered hills, the leaves having now fallen, are grey and dreary, showing the parched ground between the leafless stems, and the only relief to the eye under the cloudless sky of brass are the clumps of evergreen mango trees and palms which mark the site of some village. The time to see this upper region in its beauty is at the end of the rains. The sandbanks then have sunk under the brimming river, into which dip feathery bamboos. Everything is clothed in green, while above, in a sky of deepest, softest blue, hang masses of white cumuli. The air, though hot, is exquisitely clear, while the mountains, clothed to their tops with verdure, are visible to immense distances. There is some good scenery in Burma. The Salween, just above Maulmain, flows among fantastic limestone mountains, which rise in great precipices out of deep tropical forests. The Irawadi, too, furnishes some fine bits. In Lower Burma the defile at Prome is highly picturesque. There are few finer approaches to a capital than the narrow passage where the river rushes between Ava and the pagoda-crowned ridge of Sagain—both of them once capitals—while the line of lofty and serrated crags forms a noble background to the rich plain where the battlements of Mandalay and the golden spire of its palace rise beneath its sacred hill. The long defile above the capital, called the third defile, is pretty, while the first and second defiles, one just above and one just below Bhamo, are, especially the latter, extremely grand. The river, contracted to a width of 250 yards, has forced through a ridge of hills about 1000 feet high a tortuous channel, down which it rushes in whirling eddies between vertical cliffs 700 feet high, from whose crest and face trees and shrubs, wherever they can find lodgment, wave pendulous towards the stream. The Kyendwin also furnishes some good scenery. The wide mountain chain which separates Bengal from Burma consists of a great number of parallel ridges of soft eocene sandstones. The strata, whose strike is nearly north and south for many hundred miles, dip to the east at about 45 degrees, and break into cliffs to the west. The Kyendwin for a considerable part of its course hugs this chain closely, and the river itself and its tributaries break in several places in and out through the easterly ridges of it. Especially beautiful are the ravines through which the Manipur or Myitha and the Yew branches force their way to join the Kyendwin. I have seen few prettier scenes than the gorge of the former river. One paddles up silently, winding in and out between beetling crags, crested and draped with the luxuriant vegetation of the tropics. Monkeys leap from tree to tree, and peacocks, jungle fowl, and pheasants of brilliant hue, disport themselves in the glades between the successive

lines of cliff. When I visited these solitudes they possessed the charm of the unknown, for I believe that before I went there, in 1881, no white man had ever penetrated them.

There is in truth great beauty in the forest scenery of Burma. In the moist regions near the sea—in the Tenasserim province for instance—and in the deep dells among the mountains everywhere, there are stretches of evergreen forest, often impenetrable, so dense is the undergrowth of canes, creepers, and bamboos, some of which reach 100 feet in height. Nothing can be more delightful than one of these nooks in the forest. The sun hardly penetrates its depths, and even at midday the perennial stream, now gathering into deep ice-cold pools, now tumbling over the rocks in cascades, maintains a pleasant coolness. Ferns and flowers line its banks; bamboo sprays bend over it; tree-ferns and cycads spread their tufts above it; while over all the giants of the forest, mostly deciduous, rear their heads 150 or 200 feet aloft into the air, their stems and branches streaming with creepers, and encrusted with innumerable orchids, some stiff and erect, others drooping long flower stems full of bloom towards the ground. The orchids flower at different seasons, but it is in the hot weather, after the fall of the leaf in February or March, that most of them are in their glory. For then there is nothing to hide them from the view of the insects which fertilise them. In the early part of the hot weather, after the fall of the leaf, a series of fires rage through the drier parts of the forest, forming a magnificent spectacle at night, as they sweep in long lines along the hill-sides. Unlike the great conflagrations in the resinous pine forests of America, which destroy everything in their course, these fires, though they check and distort the growth of the younger trees, and consume dead or fallen ones, do little hurt to living trees of large size. Forest travel at this season is far from agreeable. The air is like a furnace, partly from the sun's heat and partly from the fires, while the baked soil, bare or blackened with leaf-ash and charred branches, is almost as hot under foot. Volumes of suffocating smoke obscure the view. The timid elephant—the invariable beast of burden on these expeditions—sometimes jibs at the line of fire and delays the journey. But the smarting eye of the traveller is refreshed when looking up through the smoke it sees the bright orchid blooms far above on the tree-tops.

I must not omit to mention one characteristic of the vegetation of Burma, the great number of flowering trees and shrubs, many of which are sweet scented. There is hardly any time of the year at which the landscape is not bright with the bloom, and the air loaded with the perfume, of one or more of these trees, and they are often in such masses as to form a striking feature in the scene. The scarlet of the cotton-tree, the orange of the pouk-tree, the purple of the pyinma (*Lagerstræmia Reginæ*), the yellow of the padouk (*Pterocarpus indica*), the

white of various *Bauhinias* and of the teak, are remarkable examples among many others. The *Amherstia* is even in Burma a rare tree, but no one who has seen its long salmon-coloured blossoms dropping laburnum-like from its glossy dark-green sprays will readily forget its beauty.

Having given you some account of the general physical aspects of the country, I shall now tell you of the people who inhabit it.

The dominant race, which has given its name to the country, is the largest individual element in the population. But it must not be forgotten that the dominions of the King of Burma, even after the wars of 1826 and 1852 had torn away his fairest provinces, formed a true empire, the union under a single ruler of many races and forms of polity. Subject to his sway were not only the Burmese themselves, but large sections of other civilised or Buddhist races, called Talaings or Mons, Shans, Arakanese, and Yaus, as well as numerous wild spirit-worshipping tribes, of more or less importance, Karens, Khyens, Kakhyens, and many others. All appear to be of Mongoloid extraction, but of different branches, the Burmese, Arakanese, Khyens, and Kakhyens belonging to the Tibetan branch, the Shans and Karens to branches originally settled in China. The early history of these regions is obscure, and little is known as to the order in which the successive immigrations took place, but in all probability the Talaings were first, the Tibetan branch next, the Shans, and perhaps the Karens, later. It is interesting to know that these movements of population are in operation at this moment. Under the gradually slackening hands of the Kings of Burma, the vigorous, though uncivilised tribe of Kakhyens has of late years continued to press down towards the south, driving before it the Shans and Burmese.

Let us consider first the more civilised or Buddhist tribes.

Of these, the dominant race, the Burmese, is, if we include the Arakanese, more numerous than any other, when we take the whole country into consideration, though in Upper Burma it is probably inferior in numbers to the Shans. Out of a probable total population in Upper and Lower Burma of 7¼ millions or so, the Burmese may be reckoned at about one-half. In Upper Burma the true Burmese race occupies a comparatively narrow space on each side of the Irawadi in its middle course, its chief seat being in the Moo valley, between the Irawadi and the Kyendwin. In Lower Burma, the upper part of the delta of the Irawadi and the upper valley of the Sittang are also almost pure Burmese, while in the southern part of the province of Pegu there is a considerable admixture of Talaing blood, and in some districts the population is pure Talaing.

The true Burmese is hard-featured, of moderate height, darkish in colour, though not black like the Indian, of robust frame and rather short legs. He is strong, hardy, vigorous, and capable of considerable

exertion after a spasmodic fashion. He is passionately fond of outdoor games. A wrestling-match or canoe-race in its way rouses as much enthusiasm, and gives rise to as much gambling, as a prize-fight did or a boat-race or cricket-match now does with us. His own so-called football is a sport requiring skill and agility, and he has taken kindly to the English game, as well as to cricket. He may be seen playing polo, learnt from his Manipuri subjects, in the streets of Mandalay, and the race-meetings in Lower Burma draw large and enthusiastic crowds of Burman spectators. But his energy is intermittent, and does not redeem his character from the charge of general indolence. He will abandon his work for a week to watch a regatta or a *poay*, for these poays or plays—performed either by actors in person or by marionettes worked by strings over a screen, and the Burmese show considerable skill in both forms—are as interminable as the Chinese dramas, though they are certainly more interesting to watch. The Burman, indeed, will have his holiday in season or out of season, and he endeavours with great success to make his life a perpetual picnic. He is, in fact, intolerant of the restraint either of regular work or of any other form of discipline, unlike in this to the Chinese and Hindoo. The attempt to raise regiments in British Burma has failed, and the character of its police has always been so unsatisfactory that it has to be largely recruited from India. The restraint of prison discipline is particularly obnoxious to the Burman, as witness the many savage outbreaks in the jails of Rangoon and Maulmain. In the remarkable conflict of races of which Burma is becoming the theatre I feel sure that the Burman himself will be worsted. In the north he is being pressed down by the Shan and the Kakhyen. In the south he is being ousted from manual labour, both skilled and unskilled, by the more attentive, if not more intelligent, Chinaman and Hindoo. A remarkable instance is the fact that among the many hundred labourers employed by the Bombay Burma Corporation in its teak saw-mills at Rangoon, there is now hardly a single Burman, and the trade in Upper as well as Lower Burma is passing every day more and more into the hands of Chinese and natives of India. That the Burman has during the course of more than two thousand years displayed great national vitality is certain, for though overpowered for short intervals by Shans, Talaings, and even Chinese, he has always re-asserted himself, and re-imposed his sway more firmly than before. Now, though no physical deterioration is so far apparent, the national force would seem to be dwindling. The introduction of opium and liquors with the other blessings of British rule, might have had to answer for this in part, were it not that the same decay is visible in what was till just now the King's country, where the Burman who tried opium smoking or drinking had to risk a flogging through the streets behind beat of gong—a sight I have

myself witnessed more than once in Mandalay. Judging by the experience of British Burma, the severe attitude adopted by the native government towards opium smoking and drinking, appears to show a wise insight into the weaknesses of the race. In Lower Burma, opium especially has done much to sap the character of the people. Whatever may be the case with the Chinese—and there are different opinions—there seems no doubt, that in the Burmán, the use of opium completely destroys the moral sense, and the smoker of it is liable at any moment to become a robber and a murderer. This is quite recognised by the people themselves, and our Government would probably meet little opposition if it made the use of opium penal.

But to return, the decline of which I am speaking may be due partly to contact with the civilisation and power of the West, which at the same time cut the people of the independent country off from the sea, and ensured to those of the lower country conditions which in a fertile country made life easy, and allowed full play to the national vice of indolence. However this may be, there seems little doubt of the tendency which I fear may be aggravated by the termination of a separate national existence entailed by recent events. I hope I may be wrong, for it would be a pity to see the disappearance of a race which almost within the limits of this century was able to overrun Siam on the one side and Assam on the other, and which besides its warlike enterprise has many fine qualities. His religion enjoins upon the Burman certain acts of liberality, but even apart from this he is kind, hospitable, and open-handed. He is, indeed, like most Mongolian races, in some sense indifferent to human life, but he is rarely gratuitously cruel. You may ask—what about King Theebau? Well, no doubt under his rule a great number of cruel acts were done, but, so far as I know, they were all done with a political object, and were in many cases, considering the circumstances, political necessities in the eyes of his advisers, and the details were often grossly exaggerated by the newspapers in India. In regard to one batch of alleged massacres, that which is said to have taken place in 1880, I can say with confidence that, having been in Mandalay at the time, and having taken trouble to get to the bottom of the evidence, I am firmly convinced that the allegation was absolutely devoid of foundation. An extremely bad government Theebau's undoubtedly was, and he is, of course, responsible for its crimes, but there is good reason to think that he never instigated, and was often remorseful for them. After the execution of his brothers, he for a time drank heavily, and I was told at the time that this began in an attempt to drown his remorse. The habit was encouraged by men who had designs upon his life and throne—their subsequent execution was called a massacre—but he had long entirely abandoned it. Personally, Theebau always appeared to me—and I saw him a number of times—a stupid, rather sensual-looking, but amiable

young man. He had a particularly soft and sweet voice, a very unusual thing for a Burman.

The Burman is light-hearted and merry, fond of chaff, and, unlike the Hindoo, with the thorough appreciation of a joke. He has less servility, and when away from the demoralising influences of the Court, more regard for truth than most Orientals. Altogether his character, religion, and habits insure his being regarded by us more as a friend and equal than as an inferior.

The character and demeanour of the people is well illustrated by their dress. Both men and women wear gay variegated silks, and decorate themselves with flowers. No more brilliant sight can be seen in the world than one of the festivals at the great pagoda of Rangoon, when its wide platform is thronged with thousands of gaily-dressed people praying, making offerings at the shrines, listening to sermons from monks, gossiping, or feasting. The air is filled with the sound of bells and gongs and the hum of the great multitude, while above all rises the golden bulk of the mighty pagoda itself, shining in the sunlight.

About the origin of the Talaings there are several theories. Some consider them an aboriginal race of what is called the Kolarian type, while others believe them to be immigrants of Mongolian race. Their language, hitherto little studied, is now being investigated by a competent scholar, Dr. Forchammer, whose researches will no doubt cast light on their origin. This language is now almost extinct in Burma, but it is still spoken by the settlements of this people in Siam, and said to be allied to the speech of the Anamese. In appearance the Talaings are smaller, plumper, fairer, and less hard of feature than the Burmese; but in religion, character, and habits, they are now hardly distinguishable from their hereditary enemies. The Talaings, whose kingdom used to embrace the delta of the Irawadi and Sittang, probably still form the bulk of the population there.

From China appear to have come the great race of *Shans*, or, as they call themselves Tai, who have the largest numbers of any people in the Indo-Chinese peninsula. They occupy the whole of the Mehnam, almost the whole of the Mehkong and the Salween, the Upper Sittang, and a large part of the Irawadi, extending from it into the valley of the Brahmaputra. They thus form a very important part of the population lately subject to the King of Burma.

Though the Shans are thus powerful in numbers, some inherent defect in their character or organisation has prevented them ever keeping together as a whole. The King of Siam, the only sovereign representative of their race, bears sway over a comparatively small section of it, the great bulk being subject either to the King of Burma or to China, some of them to both. But though in subjection, the Shans have mostly retained their political organisation. There is an oligarchy

of nobles arranged in a regular gradation, of whom the first or chief prince, called in Burmese Tsawbwaw, is theoretically supreme, but whose power is practically much limited. Estates go with the various offices in this oligarchy, and the succession to both is limited to certain families, but it by no means always goes to the eldest son, or even eldest male of the family, and the succession may be carried by the female. The selection of a successor to any of the places in the oligarchy seems to be made by the other members of it, but requires confirmation by the overlord, the King of Burma, or the King of Siam, as the case may be. The succession often gives rise to protracted disputes, and at Mandalay was the occasion of great extortion. It was in this way that Theebau lost his authority over a large group of the states to the east of Mandalay.

In face and figure the various branches of Shans differ little. They are, speaking generally, a well-grown, athletic race, bigger and stouter than the Burmese. Both men and women have often magnificent figures. In complexion they are fairer and clearer than either Burmese or Chinese, and in the mountains many of the women have nearly white complexions, with rosy cheeks. The Shans have broad round faces, with large eyes, slightly deflexed at the inner corner, but less so than in the Chinese, small, rather flat noses, and widish, thick-lipped mouths, which are often opened in a broad grin, for the Shan is naturally a jovial, simple fellow, always ready for a laugh. They are sometimes described as indolent and apathetic, hardly a fair account, I think, of the northern Shans, who push over immense distances all through these obscure regions in pursuit of their favourite occupation of peddling. But they do not seem to have either the intermittent vigour of the Burmese, nor the steady attentive plod of the Chinaman, and this absence of force no doubt explains to some extent their political separation and helplessness as a race.

The dress of the Shans has been affected to some extent by the influence of the particular dominant race, but speaking generally, their taste is for sober colouring.

Of the non-Buddhist races within the limits of Burma, the most important are the Karens, Kakhyens, and Khyens.

The *Karen* race is widely extended over the peninsula of Indo-China, and embraces many tribes. Of these the principal, within the limits of Burma, are called the White and the Red. The latter inhabit a small territory called by their name at the eastern end of the late frontier between Upper and British Burma. They are a wild intractable race, who after many attempts of the Kings of Burma to subdue them, at length succeeded in getting their independence recognised. There is no central authority, and the chiefs of the various sections of the tribe seem to wage continual war upon each other.

The White Karens, who live within our borders, are a shy, peaceable race, mostly inhabiting the mountains of Tenasserim. There are large

settlements of them also at the western side of the Irawadi delta. Some few of those who have descended into the plains have become Buddhist, and dress like the Burmese, but they have never mixed either with these or the Talaings. The hill people have retained their simple spirit-worship, and it is among them that the missionaries, American, English, French, and Italian, have been most successful. For the Buddhist with his highly metaphysical creed, and elaborate code of morality, almost never accepts Christianity.

The Karens are generally small in stature, with rather flat faces, which have a gentle, timid expression. Their original seat seems to have been South-western China.

The Kakhyens and Khyens belong to the Tibeto-Burman branch of the Mongolian race, and are spirit-worshippers. The various tribes are, like those of the Red Karens, often at war with each other. Neither race has ever been practically subject to the King of Burma, and for many years his attitude towards them has been much more defensive than aggressive.

The Kakhyens, or Singphos as they call themselves—the word *singpaw* means "man" simply—inhabit the upper part of the valleys of the Irawadi and Khyendwin, and extend over into Assam and China. In Burma they reach as far south as latitude 25°, while in the east they have pushed down along the mountains as far as latitude 23°, and the movement is still going on. They are certainly a vigorous race, and in Assam have a much better character than in Burma. I believe, however, that the treacherous and extortionate Burman is largely to blame for the intractability of the Kakhyens of the Irawadi, and it would not surprise me if, under English administration, they became a valuable element in the population.

The Khyens, a cognate race, inhabit the great range separating Burma from Bengal, southwards, from about latitude 24½°. They are in appearance and manners very similar to the Kakhyens. One peculiar custom they have, that of tatooing the faces of the women when they reach the marriageable age, apparently with the view of making them unattractive except to their husbands. I shall have occasion to say more about the Khyens immediately.

And now, to give you an idea of what life and travel in Burma are, I may with propriety offer you some account of a journey I made in 1881 in the little-known region of the Kyendwin, where for fifty years no European had been seen till I went there, and into some parts of which I believe I was the first to penetrate. Having taken from the king a lease of the teak forests in this district, I was anxious to visit them, and when the manager of the Irawadi Flotilla Company asked me to join a party which he had arranged with the view of examining the capabilities of the Kyendwin for steamer traffic, I gladly accepted his offer.

You will remember what I told you about the river which drained the eastern sides of the mountain ranges in this region having less water than those which are fed from the western sides. The Kyendwin is a case in point. Though it must have nearly as long a course as the Irawadi, it is in the dry weather a good deal smaller, and at the time we entered it had sunk to a low level. The navigation therefore presented many difficulties, and it took us nearly three weeks to reach the point about 250 miles from the mouth, beyond which it was found impossible for the launch to go.

In the rains, however, there is said to be less comparative difference between the Kyendwin and the Irawadi. The rise in height of the former is quite as great—40 or 50 feet, and it inundates its valley widely, just as the Irawadi does. This consideration may serve to weaken the argument that the vast body of water brought down by the Irawadi in the rains can only be accounted for on the hypothesis that it is identical with the Sanpo of Tibet.

A few miles up is Moonyuwa, the principal emporium of the valley. Here we found several Chinese merchants, and a great number of the large boats, by which the traffic of this extensive region is done. The owner of the boat is also the trader, and with his family, spends the whole of his life on the vessel. At harvest he times himself to be in the rice-producing districts up the river. Loading his boat with that grain, he works down the Kyendwin, selling his cargo wherever he gets the best prices, till he reaches Moonyuwa, where he parts with what remains of his rice, and any hides, horns, beeswax, sticklac, or ivory he has been able to pick up above, and for his return journey buys English salt, cotton piece-goods, turkey red and other coloured yarns, silk handkerchiefs, knives, needles, nails, and other such small wares. His cargo on board, he toils back up stream, poling all the way along the bank, for the current is strong. After many weeks, it may be, of this work, he fixes himself at some village, builds on the bank a booth, as a shelter against the sun, and his womenfolk proceed to dispose of their wares. There they remain till the next harvest comes, when the old round is repeated. The boats generally go in parties as a protection against robbers, or as they they are called in India, dacoits, a word you must of late have seen frequently in connection with Burmese affairs. And I should perhaps say that in those semi-civilised regions little stigma attaches to that profession; it is not so very long since the highwayman was rather a hero among ourselves.

Aloungpra, the founder of the late dynasty, seems to have been little better than a dacoit to start with, and even lately there is reason to believe that some of Theebau's ministers, the Tinedah Mingyee for instance, were in league with robber bands. The Yenoung Prince as he was called, the reigning favourite in the early part of Theebau's reign, was certainly a dacoit while his father was a leading officer at court.

Of course in the case of men of official position all this was *sub rosa*, but I will give you an instance to show how little disgrace attaches to the calling. Talking one day at Mandalay to a highly respectable Shan forester, to whom we were about to advance a large sum of money (he was one of the right-hand men of the Tsawbwaw or Prince of the State of Moné) I noticed, his jacket being open, that his breast was covered with the little lumps which indicated the presence beneath the skin of pieces of ruby, sapphire, gold, and what not, inserted in the flesh as charms against wounds. "What need have you for so much of this kind of thing?" I asked. "Oh," said he, in the most open-air way, and without the slightest change of countenance, "I was bred for the profession of dacoit, and of course I had to make myself invulnerable," and I may add that he genuinely believed that he *was* invulnerable. Although, however, the calling is hardly a disreputable one, it is needless to say that the dacoit was not allowed to have it all his own way, else there would soon have been nobody left to rob, and under the theoretically excellent Burmese system of holding the district responsible, a hue and cry was now and then raised, and an attempt, sometimes successful, made to exterminate the gang. The regular mode of punishment was crucifixion, and as the Kyendwin has always been infested by dacoits the ghastly instrument of execution, a St. Andrew's cross, is a frequent object on its banks.

The delta, if I may call it so, of the Kyendwin may be said to end about 40 miles from its mouth, where low hills begin to appear on both sides, but in the valleys of the main river itself and of its tributaries there are many fertile plains. In good years the Kyendwin valley exports a good deal of rice and other grains. There is everywhere evidence in the shrunken towns and deserted villages that the country could maintain a much larger population. About 70 miles up, the most eastern of the parallel ridges forming the dividing chain between Bengal and Burma is approached, and from this point as far up as I followed its course, about 150 miles, the river keeps close to the chain, through the pretty scenery I have already described. Here an amusing incident occurred. I ascended the hill behind a town to get a view, and saw to the east, on the other side of the Kyendwin, one of the great lagoons or backwaters produced by the inundation of the river during the rains. I could perceive through my glass that it was covered with water birds, of which vast numbers frequent the rivers of Burma during the winter, to return across the Himalayas, as the hot weather comes on, to their distant summer quarters in Tibet. Now the sight of these countless geese, ducks, and teal was an appetising one. The supply of the commissariat was always a difficulty under the Buddhist *régime* of Upper Burma. To slaughter cows was criminal, sheep there are none, goats are scarce, and unsavoury when you do get them. But on the beaten track of the Irawadi prejudice is so far relaxed that chickens may be

bought with an unconcealed purpose of slaughter. Not so on the remote Kyendwin, where not even furtive visits by night and the payment of exorbitant sums were always successful in getting over the prejudices or fears of the possessors of barn-doors. Under these circumstances one would often be without food if the gun did not provide it, and it happened that at the moment we were rather short. So when on descending to the town I paid a visit to the *woon* or governor of the district, I asked him for men and boats to enable us to shoot over the lagoon. He was very civil, but said that as the old king had given charge of the lives of the wild birds on this lagoon to the monks of the neighbouring monastery he might get into trouble if he helped us. I of course did not press him, and, not thinking any evil, we got boats and men for ourselves and made an excellent bag, none the worse for the immunity the birds had hitherto enjoyed. While on the water we had heard shouts from a number of people on the bank, and on landing it turned out that these shouts had been meant for us. We were requested to visit the monastery, and on asking why, were told that the head monk wished to pound us with his elbow for having killed his birds. To inflict this punishment the operator squats on the ground, the culprit being laid on his face with the small of his back immediately under the elbow of the chastiser, who, doubling his arm, makes a succession of sharp digs with his elbow into the soft part of the back below the ribs. The punishment may be made painful and even dangerous, and as, moreover, it would have injured the prestige of our country for its first travellers to submit to even ecclesiastical chastisement, we, under the whole circumstances, respectfully declined the honour of an interview with his eminence the abbot.

Pursuing our journey to the north we find the river keeps closely to the eastern foot of the mountains. It cuts through several of the outer parallel ridges, and at about 180 miles from the mouth we reach one of higher ridges alongside which the valley henceforth runs, with the serrated forest-clad tops of the mountains rising about 2500 to 3000 feet above it. On the east there is low hilly country, in which are a number of well-cultivated valleys; each of these forms, roughly speaking, a separate principality, under an hereditary chief, called Myothoogyee. In former times these chiefs were practically independent, and possessed the power of life and death. Of late years the King of Burma has endeavoured to tighten the reins, by planting governors all over the region, but their authority has been little regarded. A fertile source of dispute was the succession to the chieftainship. As I have said, it was hereditary, but there was no regular order of succession within the limits of the family, any more than there was in the case of the royal family of Burma, or of the Shan principalities. Any member of the family who could get recognition at Mandalay, and could hold his own, might assert a claim, so the factions of the various claimants, while they

carried on intrigues at Mandalay, used also to fight on the spot. And even a decision at Mandalay did not necessarily end the strife. For of late years the claimant successful at court was invariably the most lavish briber, not the man strongest and fittest for the post. The central authority being weak, the rival claimant or claimants not seldom persisted, and there resulted bloody feuds, often prolonged for years. While I was on the Khyendwin, one of the governors attempted to assert the King's authority in a case of this kind, but he was beaten off, and I saw his boats retiring discomfited down the river.

The inhabitants of this region are mostly of the tribe called Yaus. Their dialect is generally said to be a variety of Burmese, but the people themselves are much more like the Shans, being larger, fairer, of softer features and voice, and more fleshy, as the Americans would say, than the Burmese. The women are on a much larger scale than their Burmese neighbours, and often very handsome, after a Mongolian fashion. Their dress, too, both in design and colour, savours more of the Shan than of the Burmese taste. The Yaus have given their name to a river and district to the west of the Irawadi, below the mouth of the Kyendwin, but it will be seen that their range is much wider than this localising name would denote. They, in fact, form the bulk of the population of the whole of this region from latitude 20° to beyond latitude 24°. On the Khyendwin there is some infusion of Burmese blood, especially near its mouth, and in the northern part we find the Shan district of Kalé. About latitude 24° the blood becomes more purely Shan. On the frontier of Munipur is the Shan principality of Thoungthwot, or Sumjok, and on the other side of the Khyendwin the Shans extend across to the Irawadi.

Left alone, when my companions had returned with the launch to Rangoon, I proceeded during the next two months to traverse the forest region backwards and forwards across the river, working gradually to the south, my object being to examine the teak-producing districts.

Travel presented some difficulties. I had practically no European provisions, so had to content myself with what game I could shoot—my ammunition ran very short—the few chickens I could purchase, and cakes made of pounded rice. I had an order from the king to procure as many elephants and men as I wanted, but in spite of this found it often very difficult to persuade the villagers to accompany me into the districts exposed to the raids of the Khyens.

We had of course always a number of elephants to carry the baggage and provisions of the party. As a beast of burden the elephant is indeed indispensable in forest travel, no other animal being able so well to cross rivers, mountains, and pathless forests. It is wonderful to see how the creature manages his unwieldy bulk on a slippery descent, or an almost vertical upward slope. His height enables him to step over fallen trees, while with his trunk and his weight he can force a passage through

seemingly impenetrable undergrowth. But except when a river had to be crossed I preferred walking. Travel on an elephant's back is by no means agreeable. His motion is a peculiarly unpleasant combination of a pitch and a roll, and perched aloft on an insecurely fixed car one has always the chance of being precipitated—it may be down a cliff—should a casual branch catch the car, or the girth give way under a particularly violent lurch; and unless the driver is very careful there is always the risk that one may be blinded or hooked off by some overhanging branch.

I had no tent, but with a waterproof sheet below and a thick rug above I managed to defy the cold and heavy dews of the forest; nor, though I used to bathe in the forest pools and drink the forest water, did I ever have a touch of fever in this region, reported so deadly.

My first expedition was to the Kubo valley across the forest-covered ridge to the west of the Kyendwin. These mountains are quite uninhabited, but some hunters, who were taking dried deer-flesh to sell on the Kyendwin, reported several raiding bands of Khyens to be on the war-path. Though we were a party of thirty, all with firearms of some sort, the Burmese officials who accompanied me and my own Burman followers were dreadfully alarmed, pressing me to return, and when I had at last got them to start they kept in the rear, allowing me, my Chinese interpreter, and the Madrasi cook to lead the way. Emerging into the plain of the Kubo valley on the third day we reached Khanpat, the chief town of the district, without molestation. The Kubo valley is a great depression which extends for about 250 miles from north to south between the first and second of the great parallel ridges of the main chain. It varies in width from 10 to 20 miles, and forms an almost level plain. At about latitude 20° 40′ there is a slight east and west elevation, which forms the watershed between the two sections of the depression. The two sections are drained by rivers, both of which have broken passages to the Kyendwin through the dividing ridge. During the rains, owing to the very slight difference in level between the Kubo and the Kyendwin valleys, and the extreme narrowness of the passages joining them, the water, especially in the southern part, rises to a great height in the inner valley, and there being no flow there is an immense deposition of alluvial matter. It is indeed clear, from the great depth of alluvium and absolute flatness of surface, that at no distant geological period the whole of this depression must have been a lake.

This Kubo valley is considered the richest portion of Upper Burma, the yield of rice being said to be one-hundredfold. It was once populous, but owing to the long wars of Burma and Manipur, and to the raids of the Khyens, it has now become in large part a jungle-covered wilderness. The chief towns, once large cities, now include within their walls only a few hovels. The numerous tribes of wild Khyens who inhabit the central ridges from latitude 20° to latitude 24°, have in the intervals of

their own internecine feuds found a profitable variety in raids down into the low country, extending these as far even as the Kyendwin. Their raiding season is the dry weather, for in the rains the country is impassable without boats. Creeping in bands of 50 to 100 through the jungle, they surround a village at night. The villages are protected by stockades of teak beams, and a single or double *chevaux de frise* of bamboos outside, the jungle being kept cleared to some distance. Inside, at intervals of about 15 or 20 yards, are platforms on which the villagers sit by turns all night through, firing guns every few minutes to show the Khyens that things are ready for them. The game of the Khyens is to find the watch ill-kept, when they either clamber or throw fire-brands over the stockade, for the houses, being of bamboo and thatch, are very inflammable. If the fire catches they effect an entrance in the resulting confusion, and kill those who do not surrender. The survivors are carried off into captivity on the mountains, when they are worked as slaves till the ransom which is put on their heads is paid; but if they do not try to escape they are not as a rule unkindly treated. A few of them do manage to escape, but most die in captivity, for the ransoms are comparatively large, and many have no relatives left to take the trouble about the collection of it, often a matter of years. It is, however, a work of religious merit in this region to contribute and I was often asked to do so. One old woman told me she was within a little of making up the 500 rupees to ransom a son who had been in captivity for fourteen years, and I gave her what was needed to complete the tale. I began to realise what all this meant, the first night I spent in the Kubo valley. At sunset I went out of the gate of Khanpat to bathe in the clear stream, which flowed at a little distance from the town, over a pebbly bed. In the twilight I soon saw a dusky group gather on the shore, and thought this was a case of the usual curiosity. For all over this country, where no white man had ever been seen, my appearance was the signal for a crowd to collect. They would gaze at one for hours, and the bolder would feel my clothes and press me to turn up my shirt-sleeves, not believing that the skin could be white all over. If I slept in some village house, I used to be conscious, from a number of whispers as I awoke in the grey dawn, that the room or verandah was full of curious gazers, so that my toilet was often a matter of difficulty, and this kind of levée used to last practically till one went to bed at night. But on this occasion I found curiosity was not the cause. All the men were armed, and I was told they had come to prevent the Khyens who might be lurking in the jungle, from swooping down and carrying me off. When I got back to the town I found the guard platforms manned, and all night long my slumbers were disturbed by the discharge of the watchers' guns close to my ears, for the place was very small. As my journey went on I got quite used to the sound. I was never attacked, though one night a village a mile from where I slept was burnt, and its

inhabitants killed or carried off. In the course of my journey I traversed most of the southern part of the Kubo valley, and visited its chief town Kalé. This, the ancient capital of a great principality, I found in sad plight. Its extensive brick enceinte and the remains of fine monasteries, testified to the former importance of a city which now only reckoned a few hovels. The Tsawbwaw, or prince, was living at Mandalay in disgrace, having been connected by marriage with one of the Burmese princes who rebelled in 1867, and the Burmese governor who replaced him was living in the Kyendwin valley at a safe distance. The Tsawbwaw had in his day possessed great influence over the Khyens, and the evils under which the valley suffered were said to have greatly aggravated since his removal. Hoping that his restoration might improve matters, I made interest at Mandalay, and eventually succeeded in getting him reinstated. But whether things had gone too far or his age has made him less active, I hear that he has not so far done much good. However, now that our Government has come, we may be sure that the wild tribes will be kept in order, and that this rich region will recover its former prosperity. It will undoubtedly prove one of the most valuable parts of the new province.

From Kalé I made my way to the south, up the valley. On the high range to the west, 4000 or 5000 feet in height, could be seen distinctly the clearings and villages of the wild Khyens. They cultivate hill rice, cotton, and other plants, on what is called the Toungya system. A patch of jungle is cleared, the trees are burned for manure, and the seeds sown in the ashes. One crop is taken, and then the plot is abandoned, not to become cultivated again till, years afterwards, it has become covered with jungle afresh. All up the valley the stream keeps nearer the eastern than the western side, and as for fear of the Khyens, cultivation and villages are confined to the side of the river furthest from them, the major portion of the valley has become covered with forest, in which both teak and cutch occur abundantly. In the fields every man works with his gun by his side, and keeps as close as may be to his village, so that wayfarers are few, and the rich landscape has a desolate aspect.

At one village I had an illustration of the way in which the feuds with the Khyens are perpetuated. The headman, who had an unusual reputation for bravery, had made proposals of amity to the neighbouring tribe of wild Khyens, and told me his intention was to make them drunk on rice beer, for which they have a weakness, and then massacre them all. I left two days before this laudable plan was to be carried into execution, and never heard the result.

It will be seen how interesting and complicated are the circumstances of this great possession. It will require a delicate and yet firm hand to deal with the numerous and intricate problems presented by the relations with the wild tribes, the Shans, and our new neighbour, China,

but we may have confidence that the success which has attended us so far in Burma will not desert us now. The experience of Lower Burma has shown that the Burmese are easy to govern, and once the disturbances natural on so great a change are quelled, our new subjects of that race will prove equally tractable. It is possible that the settlement of the country may take a longer time than it did after the previous wars; for those wars only lopped off members of the old empire—they left the heart. The officials of the lost provinces were still able to find scope for ambition and intrigue at Ava. But now the heart itself has been struck at, and we must expect it will die hard.

From the Shans, if they once come in—and they appear likely to do so—there will be no trouble. Considering their strength if united, it is wonderful they bore the heavy Burmese yoke so long, and under our government their resources and population will increase.

The Khyens, Kakhyens, and other frontier tribes may give us trouble at first, as they or their relatives have in Assam, but firmness with conciliation will in time disarm their hostility. No valid inference can be drawn from the state of their relations with a government like that of Mandalay, at once weak, treacherous, and arrogant.

Our new acquisition rounds off our eastern frontier and consolidates it. Intercourse may be opened between the Irawadi and Brahmaputra. Trade will increase—though perhaps not quite so speedily as is hoped—not only from the development of Upper Burma itself, but from the access it will afford to China. In securing that our new subjects themselves contribute to the attainment of these results, there will be ample scope for the exercise of those qualities which, after all is said and done, have made England the greatest civilising power the world has ever seen.

After the paper,

Mr. HOLT HALLETT said he had listened to Mr. Bryce's account with the very greatest interest. A great part of the basin of the Kyendwin visited by the lecturer had never been previously described, and he was glad to hear that large and rich plains existed not only along the main stream but in the branch valleys. Mr. Bryce's account, where it did not cover new ground, was so full and so accurate, that he did not think he need take up the time of the meeting by discussing it. He might, however, say something about the Talaing or Mun, and the Lawa or Lua, two very important races which once occupied the deltas of the Irawadi, Sittang, and Salween rivers, but were rapidly merging and becoming lost in other races. During his late journey he met many Talaing who still spoke Mun, and was told by them that the race was in three tribes, the Mun Tine, or Pegu Talaing, the Mun Dee, or Rangoon Talaing, and the Mun Myat Lawa, or Talaing of Myawaddi, Kyeikmyo, and Toungbo-myo. The Talaings found in Tavoy are Mun Dee. The Mun Myat Lawa are most likely hybrid offspring of the Lawa and Mun races. Many of the names on the map to the north-east of Maulmain are Lawa words, and these people are said to have been the aborigines of the valley of the Salween as well as of the country lying to the east of it. The Kiang Tung Lawa

must not be confused with the Baw Lawa, the race just alluded to, as they are an entirely different people with a perfectly distinct language. The Kiang Tung Lawa are an intruding race gradually pressing southwards. They are tall and athletic, and are hardly distinguishable from the northern Shans. Many of their villages are now to be found in the valley of the Meh Low river, between Zimmé and Kiang Hsen. Even the Talaing allow that the Baw Lawa are the aborigines of the country, and there can be little doubt that many of the people now speaking Tai, or Shan, and Burmese in the neigbourhood of Zimmé and Maulmain, are either pure or hybrid descendants of the Lawa. As to the Talaing, but little is known of them at present, but it is not unlikely that the Kolarians of India, the Mun or Talaing of Burma, and many of the tribes in the basin of the Mehkong are of the same race, and are descendants of the Mōn tribes, some of whom were, according to M. Terrien de Lacouperie, dwelling in China at the time of the arrival of the first Chinese immigrants into that region. The sequence of the onrush of the races into the Lawa country or Central Indo-China, seems to have been first Talaing, secondly, Shan, thirdly, Karen, and lastly, the Thibeto-Burmese tribes. Whether the Kamaits, Kamooks, and other dwarf tribes in Central and Eastern Indo-China, are descendants of the pigmies met with by the early Chinese, or whether they are immigrants from the sea-board, is another interesting question which may perhaps be solved with the aid of the copious vocabularies he (Mr. Hallett) collected of their languages and handed to M. de Lacouperie, together with those of the Lawa and other races met with during his exploration.

Sir Rutherford Alcock wished to say a few words in reference to the whole subject of Burma. The very interesting and excellent paper which Mr. Bryce had read contained a great amount of original information, and he was sure had been very much appreciated. It was impossible to divest themselves of a very considerable amount of interest on political as well as geographical grounds in the whole of that territory at the present moment. The proximity of the territory which had lately been annexed to India, to Assam on the one side, and to China on the other, made it an object of particular interest, and it would have been to any other nation than their own an object of desire and ambition. It had really been forced upon them, they did not seek it, though it was quite clear that it was most advantageous both for themselves and the neighbouring States that a settled Government should be placed there, and one which was capable of developing commerce. He should like Mr. Bryce to tell them what he conceived would be the facilities of communication between Assam and Yunnan. No doubt there had been in former times a great trade between those provinces and Burma, but from want of access to the sea, from which Yunnan was very much cut off by ranges of mountains and an unsettled region of plundering tribes, trading was a great difficulty. With a settled Government, however, in Burma, and a good understanding between Great Britain and China, new markets would spring up almost without any effort on the part of the two Governments. The Chinaman, with his industry and perseverance, qualities which, according to Mr. Bryce's account, the Burmese were rather wanting in, would, if he saw an opening, certainly push his commerce, in which not only all Burma and the Malay Peninsula would profit, but also the whole world. Fortunately they did not seek in getting any possessions of this kind, to exclude others, or to keep a monopoly; they were quite willing that the whole world should compete with them, and equally enjoy the same freedom. That could not always be said of some of their neighbours, but at all events it had long been their national principle, and he hoped it would always continue to be so. Some very interesting particulars had been given about the ethnographic element, which he was bound to say was a little mixed. Although

there was a predominance of the Mongolian element, which a friend of his usually characterised as "That unlovely race, the Chinese," it seemed that they had rather improved in appearance, according to Mr. Bryce's account, and he hoped that as there was that improvement in the physical appearance, so there might be an improvement in their moral status. At all events that country offered a wide field for anything that western civilisation could bring in aid. They were very much indebted to Mr. Bryce for the interesting particulars he had given them. They could not know too much of this country, which, as regarded India and Great Britain, had a very great future, and he hoped that with friendly co-operation on the part of the Chinese Empire, they would soon see what was once called a golden road re-established, and that it would be fruitful in bringing gold to all those who might frequent it.

Mr. ANNAN BRYCE said they were very much indebted to Mr. Hallett for the particulars he had given about the branches of the Talaings, which he (Mr. Bryce) was bound to say he did not know before. Mr. Hallett had a great knowledge of these subjects, and it was to be hoped that they would soon have a full account in the book which it was understood he was about to publish. With reference to what Sir Rutherford Alcock had said, he did not feel by any means certain that the route from Bhamo into China was the best way of approaching Yunnan and Sechuen, because on looking at the map, they would see a great number of parallel valleys running at right angles to the course of that route, and the railway would have to cross those valleys, and the rivers flowing through them, before it got into the rich country. There was the Salween, then the Mehkong, and the Kin-sha-kiang, and branches of those rivers. The gorges were very deep, and the mountains between them very high, so that the route was an extremely difficult one, and for a railway he thought practically impossible. If they were going to make a railway to Yunnan, he thought they should adopt the route proposed by Mr. Hallett and Mr. Colquhoun, namely, from Maulmein to Raheng, and thence by Lakon to Kiang Sen and Kiang Hung, close to the frontier of Yunnan. This route runs almost all the way through an easy flat country, much of which is very fertile, and only wants a larger population to develop it. That was Mr. Hallett's route, and it seemed to him (Mr. Bryce) that if they were ever going to have a railway to tap Yunnan, this was the best way to make it, because it would run up the valleys instead of crossing them. Sechuen was a really important trading country, which they would like to reach, but it was so long a way off, that he did not think they could profitably get at it from that side. That trade, he thought, would always find its way down to Shanghai. He supposed they were bound in course of time to see some communication with this south-western territory, and although his knowledge was not by any means so great as that of some others, for he had been only as far as Kiang Mai or Zimmé in that direction, he was still convinced so far as he had seen that Mr. Hallett's would be the best route, and he would consequently give his vote in its favour.

The PRESIDENT (the Marquis of Lorne) said at that late hour he would only say that the large meeting which had assembled showed the very great interest that this subject excited, and he was quite certain it would be the feeling of the meeting that it had been most adequately and most interestingly treated. He was no doubt expressing the feelings of the meeting in saying that they were most grateful to Mr. Bryce for his instructive paper.

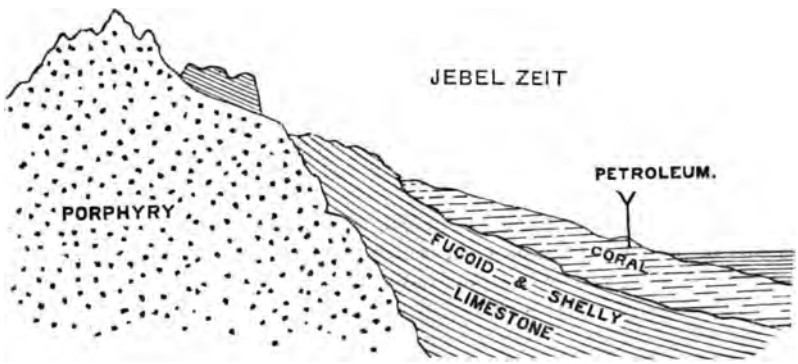
The Red Sea Petroleum Deposits.

By Colonel ARDAGH, C.B., R.E.

THE existence of petroleum on the western shore of the Red Sea at the mouth of the Gulf of Suez has been known from the earliest times. Mons Petrolius of the Romans, and Jebel Zeit of the Arabs have the same meaning, viz. oil mountain; and there is evidence that the petroleum was used by the early gold-diggers and porphyry-quarriers in the mountains inland from Kosseir and Berenice. It was probably employed by the ancient Egyptians in their embalming, if not also in other ways. The Ashrafi lighthouse, which stands on a shoal in the Strait of Jubal, 145 sea miles from Suez, lies off the oil district, the precise development of which is not yet known, the points at which its existence is undoubtedly ascertained being at present only two—Jebel Zeit and the peninsula of Jemsah. At the latter place, operations are now going on, but there is nothing doing at present at the former, which I shall first describe.

The foreshore at Jebel Zeit is a recent coral formation, characteristic of the Red Sea, existing both above and below the sea-level.

There are, at Jebel Zeit, the following formations to be observed:—A bed of compact semi-crystalline limestone containing numerous marine shells, fucoid remains, and small corals, probably of the tertiary or even secondary age, has been upheaved by a ridge of igneous rock, running (as is general in the Gulf of Suez) in a north-west and south-east direction. Much of the limestone was elevated to 600 or 800 feet above the sea, and pale, buff-coloured masses of it can be seen standing on the higher portions of the porphyritic mass.



Upon the top of this compound the usual recent coral formation has gone on, with occasional upheavals sufficient to raise the modern coral rock above the level of the sea, and form a foreshore, mingled with the débris of the older formations, comprising amongst them layers of

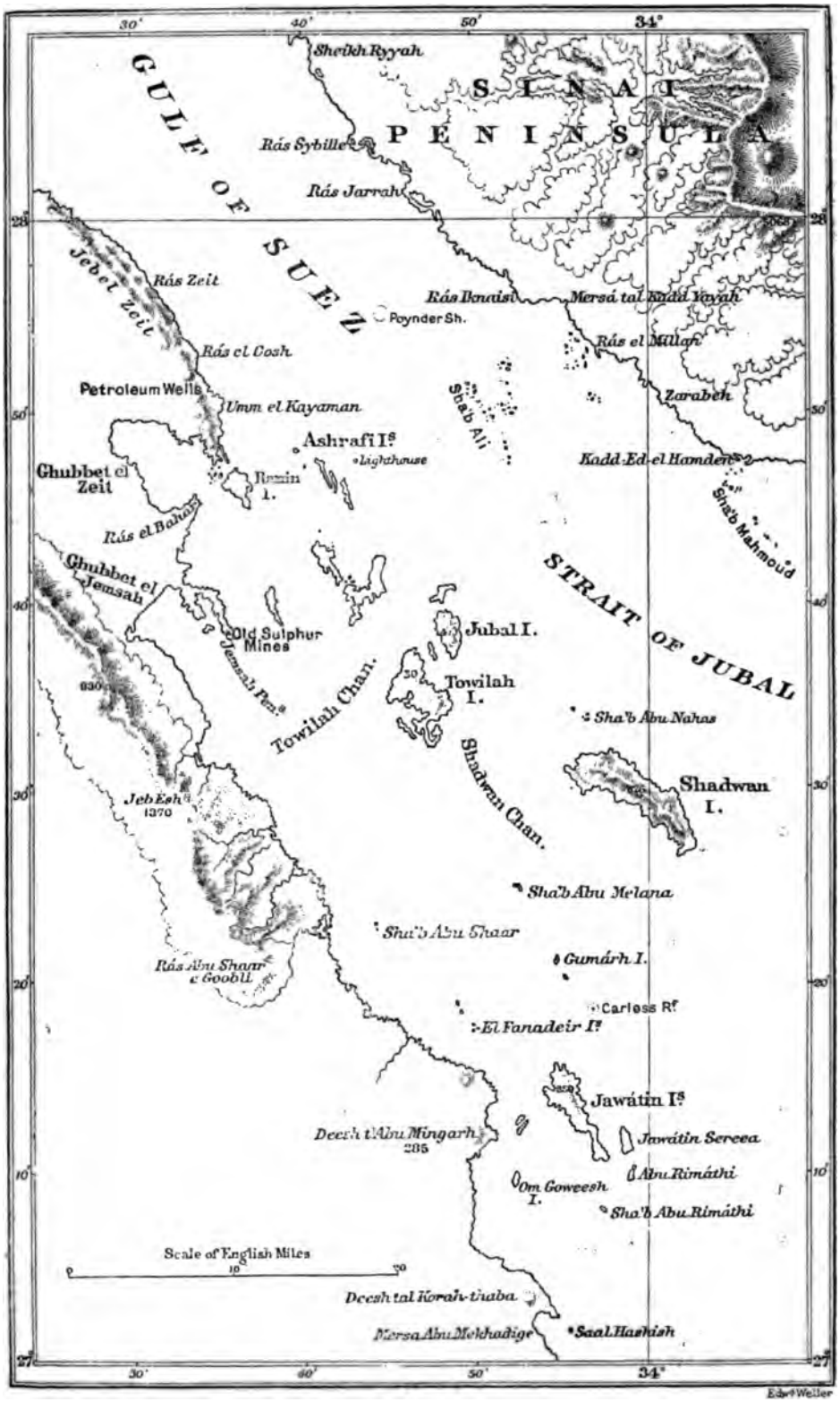
marl, and of a breccia or conglomerate, formed of fragments of porphyry, granite, syenite, horneblende, and other igneous rocks, imbedded in limestone.

Digging anywhere along the foreshore of the oil region, at 50 or 100 yards from the sea, as soon as the level of the water is reached, the strata, which are usually of a soft character, whether coral, gypsum, marl, or sand, are there found to be black and oily, and after a time such an excavation fills with salt water, with a film of greater or less thickness on the surface, composed of petroleum of the heavier kind, from which all the volatile components have evaporated, by long contact with dry heated air. The question naturally suggesting itself is, how did the petroleum get there? My theory is, that petroleum in general arises from the destructive distillation of carbonaceous matter existing in a lower stratum, and its condensation in the fissures and faults of a superincumbent stratum, the source of heat being either that natural to the earth, or volcanic, or chemical. Its presence on the sea-level is to be accounted for by the fact that being lighter than water it oozes up to the top of the strata, which are saturated with sea-water, as is always the recent coral formation. Its presence at the sea-level by no means proves that the main deposit is at or near that level; on the contrary, it points to the existence of considerable stores below, which have, from time immemorial, been filtering up to the surface.

In this particular case, I conjecture that there were carbonaceous deposits—probably vegetable, possibly animal—in the secondary limestone; that the irruption of the heated mass of porphyritic matter effected their decomposition, and that they condensed in the superincumbent strata. Upon this theory, I should regard all localities where these two limestone formations lie adjacent to igneous rocks, as probable sites for discovering petroleum—as, for instance, the Nile Valley, to which I subsequently allude. The oil which we found in the surface holes at Jebel Zeit was dark brown and thick. It could not be set fire to by itself, but burnt well with a wick of any sort. When heated to its own boiling-point it became inflammable. No doubt, all the lighter components in the original oil which oozed up to the surface very soon evaporated, leaving nothing but this dense residue. I am inclined to anticipate that the main deposit of oil at Jebel Zeit will be found between 20 and 100 metres from the surface.

The borings at Jemsah are 13 miles in a straight line from the Jebel Zeit oil-field. The existence of petroleum here does not appear to have been generally known, until lately.

In 1863 a concession was granted to the Marquis de Bassano for working sulphur on the coast of the Red Sea, including Jebel Zeit, Jemsah, and the Islands of Jawatin. The term of the concession, originally thirty years, was subsequently extended to 1899. The concessionaires began at Jemsah, where the presence of sulphur in a


30'
40'
50'
34°
Sheikh Ryyah
SINAI
PENINSULA
GULF OF SUEZ
Rás Sybille
Rás Jarrah
28°
Jebel Zeit
Rás Zeit
Rás Ibnais
Mersá tal Kadd Yayah
Poynder Sh.
Rás el Millah
Rás el Cosh
Petroleum Wells
Umm el Kayaman
Shab Ali
Zarabeh
50'
Ashrafi Is
Lighthouse
Kadd Ed-el Hamden
Ghubbet el Zeit
Ramin I.
Shab Mahmoud
Rás el Bahar
STRAIT OF JUBAL
Ghubbet el Jemsah
40'
Old Sulphur Mines
Jubal I.
Towilah I.
Towilah Chan.
Sha'b Abu Nahas
Shadwan I.
Shadwan Chan.
Jeb Esh 1370
Sha'b Abu Melana
Sha'b Abu Shaar
Rás Abu Shaar e Goobli
Gumárh I.
20'
Carless Rf
El Fanadeir Is
Jawátin Is
Deesh t'Abu Mingarh 285
Jawátin Sereea
Abu Rimáthi
Om Goweesh I.
Sha'b Abu Rimáthi
Scale of English Miles
Deesh tal Korah-tiaba
Mersa Abu Mekhadige
Saal Hashish
Edw.d Weller

gypsum deposit had long been known. Shafts and galleries were made, ovens built, and a narrow gauge railway constructed. The enterprise proved unprofitable, and was abandoned in 1869, when an action was commenced against the Egyptian Government for loss and damages, on the ground that the concessionaires had not been allowed to enrol labourers in Egypt. This suit dragged on until 1883, when the tribunal of Alexandria decided in favour of the Government, with some reserves. It was in digging for sulphur that petroleum was discovered at Jemsah, but its commercial importance had not then been realised, and only sulphur was specified in the concession. Railway, kilns, plant, houses, everything, at Jemsah was abandoned, and nothing more was done until 1884, when Nubar Pasha employed Mr. Debay, a Belgian, to examine the district with a view of working the petroleum.

Mr. Debay visited the various localities in which the presence of oil had been observed, and on his report, it was determined to procure suitable machinery and commence proper borings in lieu of the insignificant holes and galleries hitherto made. The boring plant, and a quantity of tools, machines, and engines, were procured in Belgium in the course of 1885, and in November of that year Mr. Debay, with a party of twenty-four borers, mechanics, and skilled workmen, proceeded to Jemsah. Fresh trial holes and galleries were dug, with the general result of striking, at about sea-level, a bed of gypsum, marl, or sand, from whence oozed a small supply of heavy crude petroleum. The boring machinery was set to work, and on the 28th of February 1886, at a depth of 32 metres, an oil spring was reached which produced a very small quantity of petroleum.

A second boring 60 metres from the first, struck oil on the 5th of April at 41 metres, and a copious flow immediately rushed up the tube, and poured into the gallery. No accurate measurement was taken of the quantity, but it was roughly estimated that about 500 cubic metres of liquid were delivered in twenty-four hours, two-thirds being water and one-third petroleum. As the means at hand for storing this abundant supply were relatively infinitesimal, the pipe was closed as soon as possible, and steps taken to procure reservoirs and tanks.

This last discovery may be assumed to prove conclusively that the Red Sea oil-field is commercially worth working.

The future of the petroleum industry in Egypt is certain, if the supply is adequate. The lighting oils of America and the Caspian may for some time compete with Egyptian oils even for local supply, but an enormous future lies before crude petroleum as a fuel. It appears absolutely certain that half the weight in petroleum has the same heating power as a unit of coal; and the more sanguine advocates assert that one-third or even less is the equivalent. However, taking the less favourable hypothesis, and comparing it with coal at Alexandria at 20*s.* per ton, petroleum at 40*s.* per ton there, would at least be on a

level with it, as a steam producer, apart from economy in stokers' wages; and the more expensive the subsequent transport, to Cairo, Assiut, or Assuan, for instance, the more advantageous does the substitution of petroleum for double its weight of coal become. At the point where the carriage from a seaport reaches 40*s.* per ton, the ton of coal at 60*s.* would be replaced by half a ton of oil at 40*s.*, representing an economy of one-third. Moreover, for the particular case of steamers on the Nile, the necessity of coaling at the upper stations, and at the higher price, may be dispensed with by the vessel herself carrying enough for the double journey.

What further economies may eventually become possible by the substitution of petroleum engines (in which the boiler and all its attendant objections are entirely dispensed with) for steam engines, remains to be experimented upon; but there is much reason to believe that this class of motor must replace the present steam engine for propelling ships sooner or later. On the Caspian, petroleum has already taken its place as fuel on the railways and steamers, and no doubt it is destined to do the same in Egypt, with immense direct and indirect profit to the country. The Egyptian Government is now desirous of encouraging private enterprise in the new oil-field, and of obtaining proposals for extending the borings, and erecting refineries, pipe lines, storage tanks, and other accessories to the new industry.

There are no difficulties in shipping the oil. Safe anchorages exist within a mile of the shore, and a pier is being built to facilitate shipment. In consequence of the complete absence of drinking water on this part of the coast, it is believed that Suez will become the site of the storage tanks and refineries, and it is a question whether it may not prove desirable to lay a "pipe line" from the oil district to that port, which is about 150 miles distant.

A proposal has been made by Colonel Beaumont for executing borings with the diamond-crown drills, with which he has had so much experience. This system is of great value to the geologist, as it produces, incidentally, solid cores of the stratum penetrated by the drill, and enables a judgment to be formed as to the mineralogical and palæontological character of the deposits, which is quite impossible with the ordinary boring bit.

As some of the strata adjacent to the Jebel Zeit oil district are also found in the Nile Valley, it is not improbable that oil may be met with in the latter region. The presence of igneous rocks, of hot springs, of sulphur, gypsum, and lignite, has long been known; and it has been urged that the chance of success is quite sufficient to justify the expense of the examination.

A boring has been commenced at Zagazig by the Royal Engineers, on account of the Royal Society, to procure information as to the geological structure of the sub-strata in the Delta, in continuation of

similar investigations at other points. In this scientific exploration no material reward is expected; whereas in the other case, the possible prize is of enormous value.

H.E. Nubar Pasha is fully alive to the importance of the discovery, and is desirous of having the districts in which the existence of petroleum is suspected, examined by a competent geologist. Mr. Mitchell, who was entrusted with this investigation, is still engaged upon it.

Mr. Tweddle, a gentleman of very extensive experience in petroleum, has recently been appointed professional adviser to the Egyptian Government in the matter, and the further development of the oil districts will be carried out upon his recommendations, by the Public Works Department, under Colonel Scott-Moncrieff.

Recent Portuguese Explorations in the Zambeze Region.

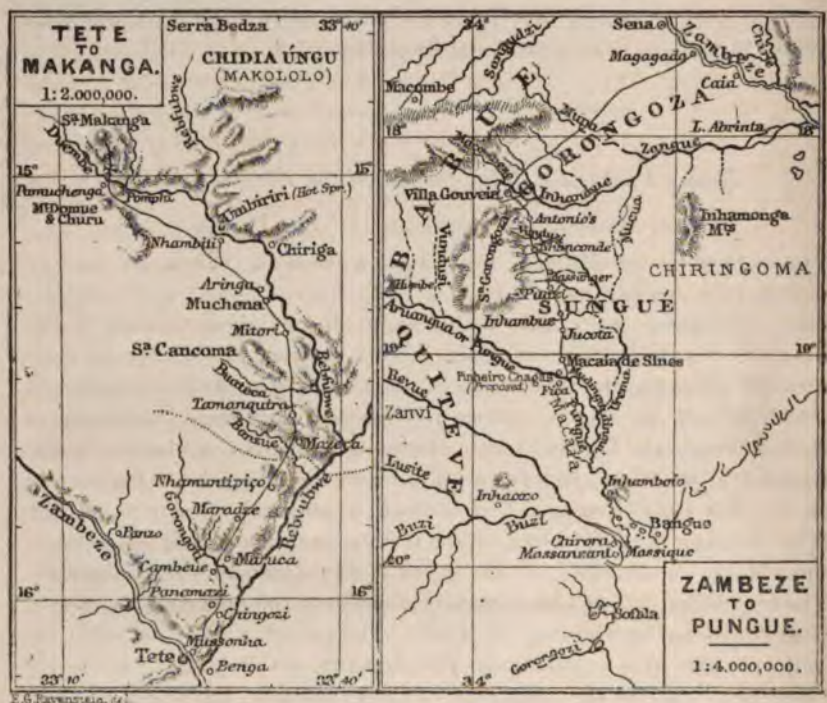
1. Between the Zambeze and the Pungué.

The gold-mines of Manica, worked at a time of which no written records have reached us, and famous since the early days of Portuguese discovery, have not ceased to fascinate the nominal masters of the country. Captain Paiva de Andrada's expedition, in 1881,* once more directed attention to this region of Eastern Africa, and the agitation which he set on foot in Portugal † resulted in the appointment of Senhor Francisco Isidoro Gorjão Moura as Governor of Manica, whilst Captain de Andrada himself, in addition to directing the operations of an "Ophir Gold Company," undertook a political mission to Muzila (Umzila), the powerful chief of the Gasa country, to whom the troublesome Vátua or Landins, to the south of the Zambeze, owe allegiance. The expedition which was to take possession of the new country started from Quilimane on October 1st, 1884. The governor, together with the bulk of the stores, went up the Quaqua, to Mopeia; whilst the "Sumtsen" carried the remainder of the expedition, including Captain de Andrada and his mining engineers, to Inhamissengo, and thence up the Kongoni mouth of the Zambeze as far as Maruro. There the stores were landed, and conveyed in boats to Magagada, a village on the right bank of the Zambeze, about four leagues below Sena. The Capitão-mor of Gorongoza, Manuel Antonio de Sousa, had undertaken to provide porters, but it was not until December 9th that the expedition was able to start for the interior of the country. On December 15th, after a fatiguing journey, in the course of which four rivulets tributary to the Zambeze were crossed, the expedition arrived at the village of Inhangou, which had been selected as a site for the new capital. It lies at the

* See 'Proceedings' Royal Geographical Society, 1884, p. 372.

† 'A Manica e o Musila' (Boletim Lisbon Geographical Society, iii. 1882, pp. 57–69).

foot of the Serra Gorongoza, close to the Inhandué river, and on the road leading to Manica. In its neighbourhood, on a sort of table mountain, accessible only by a narrow road bounded by precipices, rises the stronghold of the Capitão-mor, Massara, which some time ago successfully resisted an attack of three thousand Landins, though garrisoned by only fifty men. The new town was named Villa Gouveia, in honour of the Capitão-mor, who is known by that name to the natives. Within a short time four thatched houses for the governor and his officers, extensive stores and barracks were constructed, and Senhor M. C. da



Silva Lima * states that over three thousand natives were employed as sawyers, carpenters, masons and road-makers, who were content to work for very small wages. A road through the bush to the Pungue was also commenced. Whilst this work was still in progress, one of the miners, Senhor Cunha, left for the mines of Manica, whilst Captain de Andrada started on his mission to Umzila.

On the return of the latter, he and the governor made preparations for an exploration of the road to the Pungué, along sections of which several hundred labourers were already at work.† They left Villa

* 'Expedição de Manica' (Boletim Lisbon Geographical Society, v. 1885, p. 496).

† Senhor Moura's account in Boletim Lisbon Geographical Society, v., 1885, p. 492.

Gouveia on April 27th, travelled three hours along the new road, then crossed two small tributaries of the Inhandué, the Inhamizumguzi and the Muoze, and stopped for the night at the village of one Antonio, a headman of the Capitão-mor. On the following day the path led through high grass and dense bush. After 3¼ hours they reached the Vunduzi, a river about 70 yards wide, and difficult to ford, owing to its depth and the rocks which cumber its channel. It flows into the Sungué Lake. An hour later the Nhamnhase, a tributary of the Vunduzi, was crossed, and after a total march of five hours the party halted for the night at the foot of the Serra Gorongoza, in a wood of *mangueira* trees, called Nhanconde.* There is here a plantation of orange-trees, all that remains of an old farm of the Capitão-mor, and the natives pointed out a majestic mangueira, in the shade of which the missionaries of old celebrated divine service.

After a halt of two days a fresh start was made on May 1st. The Mucomase (a tributary of the Vunduzi) and several small rivers, including the Nhanperére and the Pompoe, which flow into it, were crossed, and after wandering for some time in the bush, the explorers arrived at the Muosa, where they pitched their camp. This river also is tributary to the Vunduzi.

On May 3rd a start was effected at 6.15 A.M., whilst the tall grass was still wet with dew. At 7.15 the Inhamezindo, a rivulet flowing into the Sungué, was crossed; at 7.50 they reached the district of Massanger, on the Puazi, another tributary of the Sungué, where they breakfasted. At 11 the exploring party stepped out of the woods upon a plain of vast extent, covered with low herbage, and flooded during the rains, when Lake Sungué covers a large extent of country. This plain teems with game, including gnus and other antelopes, buffaloes, zebras, and pigs. At 1.50 P.M. the travellers reached Inhambué, a temporary village of about twenty huts, whose inhabitants manufactured salt in a very primitive fashion.

On the ensuing day the road still led across this plain. The start was made in the midst of a torrential rain, and the carriers wanted to stop near the Muzicazi rivulet, after only an hour's tramp; but as the only shelter to be found there consisted of reeds, the travellers insisted upon going ahead, and after another hour and a half, spent upon the road, they reached Jucota, a small wood at the edge of the plain. On this day Captain de Andrada shot a large gnu (boi de mato), which supplied the whole party of eighty persons with meat for two days.

On May 5th a journey of eight hours brought the travellers to Macaia de Sines. On May 6th the progress of the party was much impeded owing to the misleading tracks of large game. The Inhamaloupa and the Zemgua, both of which appear to connect the Pungué with the Urema, which drains the Sungué Lake, were crossed, and after a march

* Captain de Andrada calls this locality Luana of Goronza.

of three hours the explorers found themselves on the Mudinguidingui, which is a channel, recently formed, of the Pungué. Following this channel upwards, the place of bifurcation was reached, and the sight of two elephants swimming across left no doubt as to the navigability of the river thus far above its mouth. The Pungué, at this spot, is over 200 yards broad, its water is clear and its depth apparently considerable. A stockade, or *aringa*, to be named Pinheiro Chagas, in honour of a gentleman who has done much for the development of colonial enterprise, is to be constructed at this spot. As the Pungué (known as Aruangua in its upper course) appeared to present great advantages for reaching the gold-mines of Manica, the Governor-general of Mozambique, Captain Augusto de Castilho, was applied to with a view to an examination of its mouth. With a promptitude quite unusual in colonial officials, this request was at once complied with, and the chart prepared by Lieut. Emygdio Fronteira shows that the depth of the river, as far as the fork of the Mudinguidingui, over 40 nautical miles from the sea, is nowhere less than five feet.*

The sketch-map accompanying this notice is merely based upon the Portuguese accounts and upon a letter which we have received from Captain de Andrada, and can therefore lay no claim to absolute correctness. Captain de Andrada informs us that a channel called Mucua connects the Zangue with Lake Sungué, which in turn discharges the Urema into the Pungué. The Sungué varies much in size according to the seasons. Hippopotami and crocodiles are numerous in it. The Buzi, which enters the sea to the south of the Pungué, can be navigated as far up as the natural bridge "Inhaudinbe," at the confluence with the Lusite. Its tributary, the Revue, is likewise navigable, and boats can go up it as far as the Zanvi district, within which lie the old mines of Bandive.

Whether these rivers present the facilities for navigation claimed for them, or not, their exploration should be welcomed as filling up a discreditable blank upon our maps of Africa.

2.—A Visit to Makanga.

Makanga is the wide domain of the Pereiras to the north of Tete, which the ancestor of the present Capitão-mor and "king" won from the Muzimbas who formerly held the country. It was through this region that Lacerda, and later on Gamitto and Monteiro, travelled when they visited the lands of the Cazembe. More recently Makanga has been explored by Captain Paiva de Andrada's expedition;† and in July of last year its ruler was visited by L. J. Vieira Braga, the governor of Tete, and a priest, the Rev. Padre José Victor Courtois, who came by

* For Lieut. Fronteira's survey, see British Admiralty Chart, No. 648.

† 'Proceedings' Royal Geographical Society, 1882, p. 418, with map.

special invitation in order that he might baptise seventeen of the children of the Cancuna-sacasaca.

The Pereiras have found a place in the history of African exploration. Their ancestor, Gonçalo Caetano Pereira, came to the Zambezé country about the middle of last century. He became known among the natives as Dambo-dambo, "the terror," and was the first Portuguese who visited the Cazembe. He and his son Manoel Caetano accompanied Dr. Lacerda as guides. Later on, this same Manoel and a brother of his, Pedro Caetano, are mentioned by Gamitto as having trading stations in the interior. The pedigree of the Pereiras given by Father Courtois does not quite tally with what we know from other sources. He mentions Pedro Caetano, of Goa, as the founder of the dynasty. His native nickname was "Chamataua" (the victorious). He was succeeded by his eldest son Pedro Caetano, "Chicucula" (the clearer). The next to rule was another Pedro, the grandson of the original Pedro, who gained a reputation for cruelty, whence his surname Kisacca, "the pillager." Chincomocanhama, who succeeded him, was deposed for lack of energy, and retired to a small village on the left bank of the Rebvubwe, where he still lives. Canhenze distinguished himself by abominable cruelties, and was deposed by his chiefs. He now lives at Tete, on the alms of the compassionate. Chituzu (Luiz Caetano) was killed on November 17th, 1870, by the accidental explosion of a barrel of powder. Chicuacha, his successor, was murdered by one of his nephews. Cancuni-Sacasaca (Cypriano Caetano Pereira) ascended the throne in 1874. He is thirty-one years of age, above medium height, and of dusky complexion. He spent three years at Quilimane, to be educated, and can read and write Portuguese, but is in all other respects a veritable savage. Nominally a Christian, he yet keeps about a hundred wives and concubines. The slightest indiscretion with respect to these ladies is punished with death, and the head of the culprit is usually exposed on a spear to inspire intending evil-doers with terror. Out of regard for his visitors, the body of a man who had been executed the day before their arrival, was hidden away in a neighbouring wood. He is a great drunkard, and on being reproved for his bestiality, asserted that he was strong and could bear it. Cancuni wears the uniform of a Capitão-mor, and protests his loyalty to the king of Portugal. Nevertheless, the inhabitants and traders of Tete have had frequent occasions to complain of the robberies and murders committed within his territories. These, Cancuni avers, were the acts of his brother, Luiz Chaguadera (now dead) and of the Makololos. To

* 'Terras de Macanga, pelo P. J. V. Courtois' (Boletim Lisbon Geogr. Soc. v., 1885, p. 502). The sketch-map which accompanies this paper is a reduction of that supplied by the Padre, and contains all the names of the original. On comparing it with the map of Capt. de Andrada's companion, M. de Kuss, it will be found that the Padre has considerably exaggerated the distances travelled. Muchena, which he places in lat. 15° 20′ S., is in reality in lat. 15° 40′ S.

prove his loyalty he granted permission to establish a military post in Makanga, and promised to build a church and a school. The stockade or aringa, within which he resides, covers an area of 300 by 500 yards. The Rebvubwe protects it on the east, and a row of palisadoes with a deep ditch in front on the remaining sides. It is divided into four courts. In the first court is a shed, beneath which the drums and other musical instruments are deposited; the second court contains a grange (*churu*) and the court of justice (*machoça*); the third, dwelling-houses; and the fourth, the harem.

The chief's aringa is within three days' march of Tete. The governor's party started on July 8th, 1885, crossed the river in boats, passed through the Prazo of Chingozi and Panamazi, which belongs to Massangano,* and breakfasted in the Prazo Cambeue, on the banks of the sparkling Gorongozi rivulet. Further on, the road led over hills, with a dense growth of scrub. Late in the evening Nhamuntipiça was reached, where music and dancing, in honour of the visitors, continued until far into the night. On July 9th the road led over hills abounding in copper- and iron-ores, down to and across the Banzue, and up to Tamanquira, which is under the rule of one of Cancuni's *manamombos* or district judges. Here the governor reproved the people for making spirits out of *mapira* (millet), and pointed to the famine, which had recently overtaken the land, as a punishment for their improvidence. The Serra Cancoma is steep and sterile, and so thickly covered with black pebbles that it looked as if they had rained down from heaven. The night was passed in the village of Mitori, where Senhor Eustaquio da Costa has a plantation. The Rebvubwe (Revugo) is close by and winds through a verdant country. It rises in the Serra Bedza in a country Chidia-únga, abounding in elephants and inhabited by predatory Landins or Macololo. The bed of this river is at first stony, but in the rainy season it is navigable for boats for a considerable distance above Benga, where it enters the Zambeze. On July 10th the party arrived at Muchena, the village adjoining the chief's aringa. The women who crowded around the visitors appeared to be strangers in the country, and were probably taken in one of the wars with the Senga. They wore clothing made of skins or bark, as cotton stuffs are too expensive. Here the governor put on his uniform, the padre his ecclesiastical attire; they both crept into their *machingas*, and, preceded by the Portuguese flag, they proceeded on their way. The nearer they approached the aringa, the denser became the crowd and the louder the discharges of guns, the beating of drums, and the playing of other musical instruments. The Capitão-mor received his visitors in full dress, surrounded by his manamombos and the members of his

* Bonga Chutare Nhamuzinga, the famous robber-chief of Massangano, brother of the Bonga mentioned by Livingstone, and son of Nyaude (Nhaude), died August 3rd, 1885, of the fumes of gin. His successor is Macombe (Bigorna), a brother.

family, and personally conducted them to the houses set apart for them.

On July 12th the padre visited the hot springs of Umbiriri, which rise at the foot of steep hills, on the bank of the Rebvubwe; on July 13th he baptised seventeen children, and on July 14th he visited an old chapel four leagues to the north-west, which Canhenze had built as a mausoleum for the Pereira family. The chapel is kept in repair, but the village near it has been abandoned owing to its exposed position. On July 17th the governor and his padre were back at Tete.

Notes of a Visit made to the Delta of the River Tocantins, Brazil.

By James W. Wells, M. Inst. C.E., F.R.G.S.

During May and June 1884, I had occasion to make a journey to Pará, to examine the Igarapé-Mirim and Abaete districts in the delta of the river Tocantins. Steamers from Europe to Pará make for Salinas, a low white cliff on the shore, a few miles to the east of the mouth of the Pará river. Here native pilots have to be engaged, in accordance with the port regulations.

It is several hours steaming up the river to the city of Pará, the distance being seventy miles from the mouth. It is difficult for any one to realise that this really is a river, for there is a nearly continuous horizon of sky and water, broken only by low-lying, dense forest-covered islands. The first near view of this forest is really wonderful for its wealth of vegetation. I have travelled through Brazil, and have resided on various parts of the coast between Rio de Janeiro and Pará, but nowhere is the forest so dense, so varied, and so essentially tropical as here. All other parts of Brazil have much in common, but here a boundless extent of lowlands intersected by channels wide or narrow, and always deep, without any break to the continual forest, stamps the Pará river with quite distinctive features.

Pará of late years has made immense strides in its trade, chiefly if not entirely owing to indiarubber. Labourers from adjoining provinces have migrated to the Amazons by thousands yearly. Numerous steamship companies have been organised, some of the steamers taking nine months on a single voyage up and down the Amazons and its numerous tributaries. Of course to meet this development other trades or businesses have likewise expanded. Streets have become paved, well lighted, drained and watered; tramways are laid down, a railway is building, warehouses and jetties border the busy wharves of the city, in fact there is a certain air of prosperity in Pará, a bustle in its streets, and generally signs of "go," which one would not expect to find in a town amid such surroundings. It numbers now about 60,000 inhabitants.

On landing I found there was a small steamer leaving at 6 P.M. for my destination, and at that hour I found myself aboard a steam launch moored alongside a species of decked barge (*batelhão*), roofed over, under which, amongst a most heterogeneous mass of cargo, the many black, brown, and whitey-brown passengers of all ages and sexes were lying in their hammocks awaiting the departure. It was, however, 9 o'clock before the steamer got away.

About 4 A.M. the launch stopped at the little river-side hamlet of Guajara, to discharge passengers and cargo. This little place consisted of the usual row of dilapidated, broken-down adobe-built houses, with an unkempt square of rank grass, the usual rickety church, tumble-down fences, and rank vegetation, trying its best to hide the squalor and ugliness of a Brazilian hamlet. The river on which we were, the Moju, constitutes the division of the delta lands of the Tocantins from terra firma. The distinction is very marked, for the lands on the right bank of the Moju are occasionally slightly elevated, and form a really dry land, whereas on the left bank the lands are level with the highest tides and become slightly inundated; the soil is also deeper.

Soon after 6 A.M. we left Guajara. The river Moju does not average more than 600 feet wide, the banks are clothed with forest, amongst which are numerous little clearings and huts, and small farms. Some of the huts were fairly comfortable, but the greater number were in a most horrible state of squalor and neglect. There is no occasion for this, as generous nature here provides all that a peasant can require to make himself exceedingly comfortable.

About 8.30 A.M. we left the Rio Moju, and entered a canal 1200 yards long and 15 yards wide, constructed about fifty years ago. This canal connects the Igarapé-Mirim waters with the river Moju. An *igarapé* is a natural navigable channel connecting one stream with another, or a side branch of a main stream; the existence of igarapés is the best evidence of the flatness of a district. The district into which we had now entered is that of Igarapé-Mirim, which in combination with the adjoining district of Abaete constitutes the delta of the Tocantins; it consists of several wide channels, such as the Muritipucu, Meruhu, Caigi, Anapu, Igarapé-Mirim, &c., all of which are connected with each other by innumerable small canals or furos.

The route we were then following is the usual course taken by all the small river craft going from Pará to the Tocantins, as by this direction the heavy seas that sometimes prevail in the broad main river are thereby avoided; it will thus be seen that this canal saves a considerable detour by the old "Igarapé-velho" route, which joins the Moju higher up. At 10.30 A.M. we arrived at the town of Igarapé-Mirim, consisting of about fifty houses, with the inevitable square and church, and one or two streets of white-washed adobe houses, but nevertheless a considerable improvement on Guajara. There was more life in the place

(if really existence in such a place can be called life at all), the houses are larger and cleaner, and less in a state of utter decay. The town is situated on high ground—that is what is considered high ground here, I think it must be quite 12 inches above the surrounding districts—and is very rarely flooded. Here we left the principal part of our cargo and passengers.

At 2 o'clock P.M. we proceeded to our destination at the sugar estate of Senhor Manoel Teixeira on the river Meruhu-Mirim, where we arrived at 5.30 P.M., where I was most hospitably received and entertained by the proprietor. Senhor Manoel Teixeira, a Portuguese by birth and parentage, now a naturalised Brazilian, is a type of the hard-working, old-fashioned Portuguese stock. About ten years ago he came to this place, purchased several square miles of land for a mere trifle, and erected a sugar-mill, and laid out his plantations. At first he owned forty to fifty slaves; but his prosperity enabled him to give them their freedom; he now employs entirely free labour, mostly imported from adjoining provinces. His exertions have apparently been well rewarded.

With regard to the Amazons delta generally, I do not know of any place on the globe that is so exceptionally favoured by nature for the cultivation of tropical produce, and yet which is so little utilised. There is a ready market near at hand, at such prices as cannot be obtained probably in any other country. There is a magnificent network of navigable streams, to carry produce from any plantation to the market in Pará, or to steamers going to Pará. The soil is exceedingly rich, and from 10 to 20 feet deep. The climate is so equable, that it is only necessary to plant anything in plots of plantations in rotation, to have a continual crop of any produce all the year round; and once planted, sugar-canes grow up crop after crop for many years; in fact, the sugar-mills work the whole year.

The tides in this district do not sensibly differ from those observed at the Marine Arsenal at Pará; the highest tides rise 12 feet, and the smallest 2 feet 3 inches. In consequence of the scouring that daily takes place in the numerous channels and canals of this district, stagnant water has no opportunity of collecting, consequently mosquitoes and malaria are rare; I consider the district for its equatorial position and exceedingly low-lying lands to be exceptionally healthy. The temperature varies from 73° on the coolest night to 90° on the hottest day; the average mean daily temperature being 83° in the shade. The lands in all directions are without exception covered with a dense forest containing some of the finest timber trees of the tropics.

I remained a few days at Senhor Teixeira's house, and accompanied him on various excursions to the different rivers, channels, farms, and plantations of the district. There are 27 sugar-mills at work, most of which have steam power; they grind cane all the year round, and boil the juice in open pans, which necessitates at

least 8° Beaumé of saccharine matter to make decent sugar, and is a proof of the exceptional fact that the canes mature at any period of the year in this favoured district. I saw a cane-field 20 years old, from which yearly crops had been taken without re-planting; this is usually the case with most of the plantations, until the fields become so neglected and dirty, that it is cheaper to plant a fresh patch. Cultivation of sugar-cane is the principal occupation of the inhabitants; a little indiarubber is also collected, but the trees are nearly exhausted; rice commands a high price in Pará, and there are exceptional facilities for its growth in the delta, but nothing is done with it.

A few words about indiarubber. This valuable indigenous production is annually exported to the amount of 6000 to 7000 tons, value about 1,000,000*l.*, all of which is extracted from the wilds of the Amazons. This product has been both a curse to the country, and yet the source of its prosperity. Pará through this one article quadrupled its revenue in four years, but the profits to the collectors have been so immense that all other sources of industry have been neglected, and consequently labour and provisions are very dear. Last year, however, there was a considerable drop in the price of rubber, and it is to be hoped that the thousands of labourers who have been attracted from adjoining provinces will now settle themselves to more useful and stable branches of industry. The rubber fever in Pará is very similar in its results to the gold fever of California and Australia, namely, numbers of immigrants are attracted to these regions who will eventually remain and develop the many natural sources of wealth that the country offers, but who otherwise would not have come. There is now direct steam communication by very fine steamers between Manaos, one thousand miles up the Amazons, and Rio de Janeiro.

To return to the subject of this paper. It will be seen that the Tocantins empties into the broad river known as the Pará. My opinion is that this latter river was in former times one of the main outlets of the Amazons, and that its western extremity is now silted up and is only connected with the Amazons by a number of very narrow but deep channels, through which steamers pass with difficulty. The quantity of Amazons water that now enters the Pará is insignificant in volume, and now it must not and cannot be considered one of the outlets of the Amazons, although by many geographers it is still considered to be so.

The Rio Muritupucu is the direct route for large river steamers to and from Pará and the Tocantins; its bed, like many of the other rivers of the district, often consists of rock, which forms also the nucleus of most of the islands, upon which has been deposited the rich alluvial mud of the river Tocantins, now covered by dense tropical forests to the water's edge. All these streams are navigable, and singularly free from snags.

My visit terminated, I descended the Rio Muritipucu to the Pará river, where I found a fresh breeze, and a boisterous sea that severely tried the sea-going qualities of our small steam launch. Eventually I passed through the winding channel known as the Arroyal, and thence crossed to Pará.

The German Xingu Expedition of 1884.

THE Xingu river, one of the great tributaries of the Amazons, of which we have heard little since the visit to its lower reaches in 1842–3 by Prince Adalbert of Prussia, was explored in 1884 by a party consisting of Dr. Karl von den Steinen, Herr W. v. d. Steinen, and Dr. Otto Claus, who, starting from Cuyaba in the interior, journeyed down the river to the point where it discharges into the estuary of the Amazons. Prince Adalbert had taken the opposite direction and travelled up the river from Pará. Among other important results, this expedition confirms the conclusion with regard to the geology of the interior arrived at by the late Professor Hartt, who at the time of his death was conducting the survey of the country ordered by the Brazilian Government, and Mr. J. W. Wells, who recently read a paper on Brazil before our Society, viz. that the whole interior of Brazil south of the Amazon valley has been at one time an immense plateau, and that the changes which it has undergone are due to water denudation. The party explored also the plateau of Mato Grosso, on which are the sources of so many important rivers. We take the following account of the expedition and its results from two papers by Dr. Otto Claus, published in Nos. 5 and 6 of Petermann's 'Mitteilungen,' 1886. Fuller details regarding the journey will be found in Dr. Karl v. d. Steinen's work entitled 'Durch Zentralbrasilien' (F. A. Brockhaus).

Cuyaba, the starting-point of the expedition, is the chief town of the province of Mato Grosso, and possesses a population of 15,000. Here the party was furnished with a military escort of twenty-five men for a protection against native attacks. On May 25th, 1884, the travellers left Cuyaba with a three months' supply of provisions consisting of beans, rice, mandioc, and bacon, carried by oxen and mules. A fortnight later they reached the great plateau of Mato Grosso, and on July 6th found themselves on new territory, having crossed the river Paranatinga in 14½° S. lat. Keeping an easterly course, they arrived on July 15th at the Tamitatoala-Batovy, a river about 130 feet broad, and one of the three streams which unite to form the Xingu proper. Here canoes were made from the bark of the jatoba tree, and the oxen were slaughtered and their flesh salted. The river journey was forthwith commenced, the party then numbering twenty, and on August 25th the Xingu proper was reached at 12° S. lat. The travellers navigated the numerous

cataracts of the middle course of the river under the guidance of the Yuruna Indians in canoes hollowed out from tree-trunks. On October 16th they arrived at the great bend of the Xingu called the "Volta," which they crossed overland, and finally reached Porto de Moz, at the mouth of the river, on October 27th.

Of the physical features of the country traversed, Dr. O. Claus gives the following description:—The town of Cuyaba is situated on the left bank of the river of the same name about 660 feet above the level of the sea. The river here flows in a valley about 60 miles broad, bounded on the east, north, and west, by the slopes of the plateau of Mato Grosso. The soil of the valley rests upon a basis of claystone strata, while the rest of the surrounding country is a mass of fine red sand dust. Blocks of stone of various sizes, which have the appearance of scoriæ, are found scattered over the surface of the whole district traversed, being especially numerous on the ridges of the low hills. The Brazilian name for these pieces of stone is *canga*. In the river they form a crust-like covering over the rocks projecting out of the water, giving the latter a volcanic appearance. Specimens of canga have been submitted to Karl v. Fritsch of Halle. On account of its hardness, canga is largely used in Cuyaba for building purposes. The undulating ground of the Cuyaba valley is clothed with low woods, the trees of which have a gnarled growth and stand at a considerable distance from each other, the intervening space being covered with tall grass. During half the year the ground occupied by these woods does not receive a drop of water. On the other hand, the vegetation along the numerous streams which flow into the Cuyaba assumes a totally different character. Here wide-spreading trees form a thick leafy roof over the small water-courses. The plateau of Mato Grosso is an immense sandstone formation, and possesses a mean elevation of 1475 feet above the sea-level. It extends from the river Tocantins, where the steep escarpment of the plateau is called Serra Taquara, to the Bolivian frontier, or from 52° to about 60° long. W. of Greenwich, and from 18° to 13½° S. lat. The sources of five large rivers, viz. the Madeira, the Tapajoz, the Xingu, the Tocantins, and the La Plata, are found on this plateau. To its tropical situation this comparatively low tableland owes its immense wealth of water. The air, through the influence of the south-east monsoon, is always charged with such a quantity of moisture, that even during the rapid night cooling which takes place in the dry season, the minimum temperature registered by the expedition was 43° Fahr. (6° Cent.). The watershed between the rivers flowing north and south, and also between the Amazons and the La Plata, is to be found along the southern edge of the plateau. From this fact we may perhaps draw the conclusion that the whole tableland slopes gently towards the territory of the Amazons.

The scenery of the plateau is very monotonous. The level plain is

partly covered with low brushwood and trees similar to those of the Cuyaba valley. The valleys and basin-like depressions on the plateau are the result of erosion. The slopes have the appearance of meadows, and are irrigated by small watercourses which are bordered with strips of succulent vegetation. At the upper end of the valleys, near the sources of the streams, burity palms (*Mauritia vinifera*) of great size are met with. Brazilian settlements existed at an early date on the tract of country between Tombador and the river Paranatinga. To-day all these places are deserted in consequence of the attacks of the marauding Coroados, who at times push their depredations as far as the district of Cuyaba. The Paranatinga is here a stately river about 160 yards broad, flowing at a level of more than 1300 feet above the level of the sea. Between the Paranatinga and the Xingu stretches an extensive terraced plateau at an elevation of 330 feet above the river valley of the former, and possessing a gentle slope upwards from the west. Towards the south this plateau presents a steep slope, which forms the northern boundary of a valley about 17 miles broad, running east and west. This valley is bounded on the south by the northern edge of the plateau of Agoa Branca. Here lie the head waters of the Paranatinga, and further east apparently those of the Xingu. The party traversed this valley westwards and discovered the real source of the Cuyaba. On the above-mentioned plateau are found the sources of five of the six mighty affluents of the Xingu, all of which flow in a northerly or north-easterly direction. The party explored the lake-sources of three of them. These lake-basins are of an oblong-shape, and their greatest diameter is 12 miles (*sic*). The outlet of the lakes is narrow, so that the lake appears to be almost land-locked. Between these lake-basins are hills 250 feet high, likewise the result of erosion, whose steep sides are very difficult of ascent. The party secured a sketch-map made by a Suyá Indian, which shows very accurately that part of the river-basin traversed, and also gives a hypothetical representation of the Upper Xingu territory. Four similar river-basins east of the Tamitatoala-Batovy have to be crossed before the proper valley of the Xingu is reached. The travellers decided to descend the Tamitatoala-Batovy, on which they embarked at 13° 57′ 2″ S. lat. The river flows close to the steep slopes of the plateau which are here 100 feet high and densely wooded. At some distance from the river the slopes are sparsely covered, the clay and sandstone strata being visible. Only along the upper edge is grass seen, and here also isolated burity palms, which require a damp soil, appear at intervals. Farther north the slopes bordering the river valley become lower until at 13° 30′ the river flows through level country. Within the valley, and also outside as far as 13° 14′, or along about 75 miles of the river, numerous rocky strata which in some places are 1650 feet broad, intersect the river-bed, forming waterfalls, cataracts, and rapids. The Indian canoes were found hardly

stout enough for navigating these cataracts, and in any future exploration it would be better to travel overland as far as 13°, where the cataracts cease. Through the flat country the Batovy flows in numerous meandering bends, which make the length of the river double the distance by land in a straight line. Its bed is deeply cut in the sandy soil. The highest level of the water was found from the slime marks on the trees to be over 13 feet above the then level. The banks of the river are wooded, more especially in the flat country. Swarms of mosquitoes infest all the cataracts both of the Batovy and the Xingu; the little stagnant pools between the heated rocks seem to offer special attractions for them.

The Batovy receives no tributaries of any importance, and discharges at 12° lat. into the Ronuro, a river nearly 330 yards in breadth, immediately above the junction of the latter with the Kuliseii. This great eastern branch of the main stream is about half a mile broad, and is known as the Xingu proper. The Xingu after its confluence with the Ronuro attains a breadth of 550 yards, and pursues a less winding course than the Batovy, flowing through a level country, its low banks being dotted with dense jungle. The soil is still sandy and cangas are to be seen here and there. At 10° S. lat. the character of the river changes. Here it enters the granite hills after receiving three tributaries from the right and two from the left, and attains a breadth of over 1000 yards. This point, named after the famous traveller Martius Cataract, possesses special ethnological importance as marking the natural limit of the tribes of the Upper Xingu. The formerly peaceful river now resembles at times a sea. Huge rocks project out of the water, forming whirlpools and cataracts. The scenery is varied in the extreme. At one point the river possesses a breadth of a mile and a quarter, while at another it flows between hills only 220 yards apart. These hills, from 1000 to 1300 feet in height above the river-level, force the Xingu into great bends, their densely wooded sides sloping very precipitately towards the river. The incomplete representation of these hills on the map prepared by the expedition is due to the rapidity of the journey and the imperfect view which the narrow channel of the river at times afforded. The Xingu receives only two important affluents from 10° to 3°, both from the left, one of which is the Guiriri, but the immense volume of water which flows down from the hill slopes helps to swell the proportions of the river.

At 3° 40′ the Volta, or great bend of the Xingu begins. This great system of cataracts has been fully described by Prince Adalbert of Prussia. The party crossed it by a new land route through the middle of the forest, the usual way being up the river Ambé, then overland to the Tucuruy, by descending which the Lower Xingu is reached. Within this great bend the river falls 260 feet. The lower course of the Xingu is navigable for steamers. Just below the Volta it is divided into

many branches by small islands. The Xingu finally discharges itself into the Amazons at 1° 45′ S. lat. a mighty stream nearly five miles in breadth. The length of the Batovy from the point of the travellers' embarkation to its junction with the main stream is 279 miles, and that of the Xingu from its confluence with the Ronuro to the Volta is 825 miles.

A large number of barometrical and astronomical observations were taken by the party, showing the altitude of all important points along the route. With regard to the climate, it appears that the north and south winds are the most frequent, the former prevailing most during the month of December, the latter in June. The annual rainfall amounts to about 60 inches. The rainy season in Cuyaba begins in September and lasts till May, no rain falls as a rule during the other months of the year. From December to March the rainfall is the heaviest, the highest figures being reached on 13th February, 1885, when in 5¼ hours 4·4 inches of rain fell. Thunderstorms are frequent during the first three months of the rainy season. At Cuyaba there is a difference of 56° between the extremes of temperature, the maximum registered being 106° in August 1884, and the minimum 50° in July 1885. The nights are cold; the travellers found it impossible on that account to sleep in the usual hammock and preferred reposing on the bare earth. On the plateau the nights are always clear; at noon masses of cumuli appear all round the horizon. Both during the night and in the morning and evening there reigns a complete calm, but between 10 and 11 A.M. a stiff breeze springs up from the north-east or north-west, which blows in gusts, ceasing about three o'clock in the afternoon. On the Volta, the proper rainy season extends from December to May, while on the Lower Xingu it commences in January and continues till June. During these months the water-level is at its highest, and the natives are compelled to change their abodes. The greatest difference between the morning and evening temperature of the water of the Xingu was 7·2 degrees (Fahr.) on September 15th. The average temperature of the water was always found to be higher than that of the air at midday. A bath in the Xingu during the daytime might be considered warm.

The ethnological results of this expedition, which are of special interest, inasmuch as the natives of this region have remained isolated and uninfluenced by European civilisation, will be found fully set forth in the work by Dr. Karl von den Steinen entitled 'Durch Zentralbrasilien.' The following information, however, is given in Dr. O. Claus' article. The different branches of the Xingu are inhabited by eighteen different Indian tribes, although the population does not exceed 2000. Among the more important of these Indians are the Bakairi, living along the Batovy; the Suyá, whose chief village is on the Xingu about 11° 11′ S. lat., and the Yuruna, inhabiting the middle course of

the Xingu between 9° and 4° S. lat. The so-called "tame" Bakairi resemble in their habits of life the Brazilian rural population, and engage in agricultural pursuits and cattle-breeding. Their produce they sell to the traders from the towns. They have lost all connection with their more savage brethren of the Xingu territory. The houses of the Suyá Indians are built in the form of a hemisphere, presenting the appearance of great bee-hives; their diameter is about 33 feet. The Suyás resemble the Botokudos in their use of lip and ear-ornaments. The Yurunas, from their intercourse with the Brazilians, are the most civilised of all the Indian tribes of this region. Their commerce with the latter consists chiefly in the exchange of their strong canoes, hollowed from single trunks of trees, for tools and beads. The small huts of the Yurunas are built on the little rocky islands in mid-stream, generally in the vicinity of cataracts. Here they have a natural defence against their mortal foes the marauding Carajas, who roam over all the country between the Xingu and the Tocantins. The travellers found the Yurunas to be excellent pilots, and in their stout canoes they were able to navigate the dangerous middle course of the river in a very short time. Dr. Steinen has, by comparing the vocabularies of a large number of these Indian tribes with others of South America, arrived at the conclusion that among the tribes of the Xingu are to be found representatives of nearly all the principal groups of dialects of South America. The traders in indiarubber have pushed their way up the river as far as 3° 40′ S. lat.; they settle on the small islands of the river, where the indiarubber trees abound. The harvest-time is during the dry months from June to December. For the other months of the year the islands are under water, and the traders ("Seringeiros" as they are called) withdraw to the small towns of Souzel and Porto de Moz, which are only inhabited during the rainy season. The commercial importance of the Xingu lies in its wealth of indiarubber; the tree is found as far up the river as 9°. As a return route from the interior to the coast the Xingu cannot be compared with either the Tapajoz or the Tocantins.

Tunisia in 1885.*

Sir Lambert Playfair, Consul-General of Algeria and Tunisia, has published through the Foreign Office an account of his tour last autumn in Tunisia, which is now part of the French Dominion in North Africa. A brief mention of this important Report was made in the 'Geographical Notes' in the June Number of the 'Proceedings,' but from the many interesting topics contained in it, I think it merits a more extended analysis.

A French colony is avowedly for Frenchmen only. Protective duties try to stifle

* Communicated by Mr. R. N. Cust.

all foreign enterprise; strangers are only tolerated as a necessary evil; if any foreign subject commits any offence which entails eight days' imprisonment, he is *ipso facto* expelled from the colony, and yet the prosperity of the colony depends on the Maltese (English subjects), Italians, and Spaniards, immigrants, who swarm there in tens of thousands.

The Consul-General with one English gentleman and a holy man of the tribe, in 1876, took a tour through the Khomair country; he was warned of the supposed peril, but he went without guards and attendants, and met with no difficulty. In 1885 he made a second visit, found excellent roads, men and women occupied with their fields, with a friendly salutation to the passer-by, and every sign of peace and contentment.

The position of the city of Tunis is peculiar: the railway now draws all the commerce to the secure harbour of Bône, in Algeria; schemes are afloat either to convert Tunis into a harbour by making a canal, or to make an entirely new harbour at Carthage just outside the Goletta. Tunisia is not annexed: the phantom of a regency is still maintained, but the power of the French Resident is paramount, the state of financial affairs is most satisfactory, and there is a surplus for public works. Cultivation has largely increased; Europeans are allowed to possess land.

Tunisia is one large archæological museum, and a perfect library of epigraphical treasure, previously unexplored. The ancient names of places have hardly changed, and the modern names are simply a corruption of Latin words. Triumphal arches, city gates, ruins of temples, mausolea, and Roman forums, are still found in their classic grandeur, and some have already fallen before the savage inroads of the railway contractors, who look upon Roman ruins as quarries of good bricks.

Sir L. Playfair, in H.M.S. *Condor*, visited Kelebia, the ancient Clypea, 58 miles from the Goletta. It was founded 310 B.C., by Agathocles, Tyrant of Syracuse, was occupied by Regulus in the Punic War, and was the last city occupied by the Christians after the Mahommedan invasion. It still survives with these ancient memories: a Spanish fortress dominates the town, surrounding the Roman Acropolis, and a water reservoir of 100 monolithic pillars. Further on is the town of Nebeul, the ancient Neapolis, and further on is Hammamat, and 33 miles further the important town of Susa, a military station, and the residence of an English vice-consul. No less than 800 Maltese are settled there. From Susa there is a horse tramway to the sacred city of Kerouan in the interior. The principal export of Susa is the famous Esparto grass, first brought into use by the proprietors of the *Daily Chronicle*. From the frontier of Morocco to that of Tripolitana this trade is nearly entirely in the hands of the English.

From Susa the Consul-General sailed to Monastir, the centre of a fertile country; —olive oil is the chief export;—thence he went to Mahadie, the site of Turris Hannibalis, whence Hannibal embarked after his flight from Carthage. In the reign of Richard II. this town was the scene of an English expedition—the first venture of our countrymen in Africa, and an unsuccessful one. The operation is described by Froissart and Holinshed. It is now a French military station.

116 miles from Mahadie is Sfax, the second city of importance in Tunisia: there are 1200 Maltese English subjects here, and a vice-consul. There is a rise and fall of five feet at spring tides, which is a unique feature in the Mediterranean. Here also Esparto grass is the chief export.

Thence the Consul-General went to Gabes; this is the basis of the daring scheme of M. Roudaire for the creation of an inland sea by the submersion of the Sahara, extending to the south of Biskra, in Algeria. This space is now occupied by the three basins, known as the Shotts. The subject is well known. Sir L. Playfair does not think hopefully of this scheme; it is possible at an immense cost of money, but no

advantages are conceivable at all in proportion to the expense incurred. M. Lesseps, the patroniser of daring schemes, approves of it.

Thence the Consul-General crossed the Syrtis Minor to Djerba, immortalised by Homer as the island of the Lotus-eaters. The distance is 36 miles from Gabes; the tide here rises and falls seven feet. There is a population of 35,000 souls on the island, and 360 Europeans; the indigenous inhabitants are not Arabs, but Berbers, and speak a dialect of the Kabail; they are Wahabite Mahommedans. The world-renowned lotus has been identified with the jujube; this idea was started by Shaw, who never visited Djerba. As a fact, the jujube does not exist in Djerba, and neither man nor beast would eat it if it did. But, according to Playfair, we need not go far to seek for the lotus—the honey-sweet lotus—all sufficient for human sustentation, the *date*, which is abundant and excellent in Djerba; it is the daily food of the inhabitants; the wine made from the sap is delicious. Both date and wine might fairly have made weary and sea-tossed sailors oblivious of their way; there were probably Sirens there also. We know how in modern times runaway English sailors have forgotten home in the islands of the South Seas, overcome by the abundance of the breadfruit and banana and the fascinations of the women.

I myself think that Sir L. Playfair is right in this conjecture. No one who has only known dates as a dry and shrunk article of commerce can imagine what they are, hanging on the trees at places like Biskra on the edge of the Sahara, where the date-tree has its feet in the water and its head in the fire. I found it a most delicious fruit, worthy to be mentioned in the same breath with the mango of Northern India.

I can only hope that in future tours Sir L. Playfair will follow the boundary line of Tripolitana and round the interior frontier of Tunisia into the unknown regions of the Sahara. The French are deserving of thanks for the occupation of Tunisia and Algeria; they have restored order, and opened the country.

GEOGRAPHICAL NOTES.

Mr. Forbes' Expedition to New Guinea.—Mr. H. O. Forbes has for the present discontinued his explorations in New Guinea, it is said from want of funds, and proceeded to New South Wales. He has obtained a large botanical and zoological collection, but was unable to carry out his intention of ascending to the summit of the Owen Stanley range. He had penetrated, however, further into the interior than any previous traveller had attained by land, having reached a point 65 miles distant from Port Moresby. The various branches of the Geographical Society of Australasia are exerting themselves to raise the necessary funds to enable him to return and complete his work.

Further Explorations in the Congo Basin by Mr. G. Grenfell.—The Rev. George Grenfell informs us, in a letter dated the 29th April, that he had recently returned from a journey in the steamer *Peace* up the Kasai and Lulua as far as Luebo Station, and was then on his way once more up the main river to Stanley Falls. He dispatched his letter from the Equator Station, together with a brief account of his previous explorations of Congo tributaries, which we hope shortly to publish with a reduction of the charts of the rivers previously sent by him.

Masai attack on an English Mission Station in the Galla Country.—In a letter dated Mombasa, June 9th last, the Rev. Thomas Wakefield gives us some particulars of the murderous attack on the mission station Golbanti, on the banks of the Tana, of which telegraphic accounts have been transmitted from Zanzibar. It took place on the 2nd of May at a time when the station was occupied by the Rev. J. Houghton and his wife and a number of peaceful Gallas and their wives and children. The onslaught was made without warning, Mrs. Houghton being the first victim, pierced through the body by a spear; her husband fell next, many of the Gallas were killed and several of the children drowned in the river in attempting to escape. This is the first time that Masai have had the boldness to kill Europeans. The cause of the attack is not known, and Mr. Wakefield was about to proceed to Golbanti, viâ Lamu, to gather further information.

Shoa and the country of the Gallas.—At a recent meeting of the Geographical Society of Paris M. Aubry gave an interesting account of the scientific mission to Shoa, with which he was entrusted in January 1883. The traveller started from Obock in company with the late Dr. Hamon, who, while on his return to the coast in August 1884, was attacked with fever and died on the banks of the Hawash. M. Aubry gave a picturesque description of the region around the Gulf of Tajurra and some important hints to travellers in the country of the Danakils. The chief of each tribe gives travellers a cordial welcome, and brings them milk and sometimes a sheep. These presents are by no means disinterested, for an exchange of gifts of twenty times more value is expected; if not, these petty chieftains will rob and harass the traveller in every possible way. The natives are cruel and cowardly. Murder is not a crime in their eyes; the homicide wears an ostrich feather, which is white if the deed is recent, black if old. M. Aubry then describes the wild barren country between the coast and Shoa. He says, "We reach Lake Assal, where the prospect is still more dreary and appalling. No life, no vegetation; not an animal or a bird is to be seen; not a blade of grass grows in this awful chaos of volcanic rocks, which one might imagine to be scarcely cooled. The path is so steep and rugged that it is often necessary to use one's hands in climbing. During the day the temperature registers 113° (Fahr.) in the shade, while towards evening, as if in mockery, a strong hot wind blows from the south-east, covering the weary traveller with dust, and preventing his enjoyment of the coolness of the night." After escaping from a pursuit of the Danakils, and also from an encounter with the Iton-Gallas, the two travellers crossed the river Hawash and reached Ankober on the 7th July, 1884. "On arriving at the country of Shoa," says M. Aubry, "the contrast is most striking. There are high mountains covered with dense forests and luxuriant vegetation; streams breaking into numerous cascades wind through magnificent prairies and fields of cotton, maize,

tief (the grass of the country), wheat, barley, beans and peas; birds of gay plumage fill the air; a perpetual spring reigns in this delightful region." He then describes the strange manners and customs of these half-civilised people. King Menelik gave the travellers a very cordial reception, and ordered a great banquet in their honour, at which, contrary to the usual practice, everything was done in European style, a table, chair, knives, forks, decanters, and even a table-cloth. The king's face, although showing the ravages of small-pox, is pleasant, his eyes being especially fine and intelligent. He appears anxious to encourage the introduction of the arts of civilisation into his kingdom; not so his courtiers, who look with an evil eye on all Europeans as likely to rob them of their wealth. M. Aubry then traversed the country of the Gallas, where the natives are very primitive, and in many districts poor. On his return journey, in June 1885, he was attacked by a party of savage Somalis, but succeeded in making his escape, and after many other perils in gaining the coast. Besides adding greatly to our geological knowledge of these extensive districts M. Aubry has made some important geographical observations. He has surveyed the source of the Hawash and its course for a distance of about 190 miles; he has also surveyed the river Mugueur, a tributary of the Blue Nile, as well as the courses of many other streams. His notes on the habits and customs of the natives, and on the products of the country, will be found of great interest.

New Expedition to Alaska.—The New York *Times* has sent an expedition to Alaska, the object of which is to explore the St. Elias range of mountains, and the country between them and the sea, while an attempt will be made to ascend Mount St. Elias itself. The expedition is led by Lieut. Frederick Schwatka, who has already done so much in Arctic travel. The "St. Elias Alps," as Lieut. Schwatka calls them, stretch for nearly 300 miles from the upper part of "the inland passage to Alaska" to Mount St. Elias, the highest peak of the North American continent. The expedition will therefore have much to do with mountain-climbing; and should opportunity present, which is very likely, attempts will be made to ascend, in whole or in part, some of the numerous peaks that project from that high range. The interior slopes may be descended if circumstances permit, for important research and discovery of any kind; for towards the interior, absolutely nothing is known of the country. Prof. William Libbey will have charge of the scientific work, and especially the hypsometrical and topographical part of it. The investigation of the glacial system of the St. Elias range will form an important part of the work of the expedition.

Further Exploration of the Pilcomayo.—M. A. Thouar, the energetic French traveller, has started on a third journey of exploration along this

river. From a report, dated 26th March, 1886, from Jujuy, and communicated by the French Minister of Public Instruction to the Geographical Society of Paris, we learn that M. Thouar left Buenos Ayres on 26th February with the object of reaching Sucre, by way of Tucuman, Salta, Jujuy, and Tarija. He then intended to descend the Pilcomayo in a canoe from Chica-Pilcomayo, about twenty-one miles down the river below Sucre. He was to be accompanied by a Bolivian escort, who would afterwards assist him to ascend the river in a special steamer of 200 tons. According to later news he reached Tarija on the 6th April.

Patagonia.—We learn from 'Petermann's Mitteilungen' that Lieutenant-Colonel Fontana, Governor of the Chubut (Chupat) district of Patagonia, who is well known for his explorations in the Gran Chaco, has completed an important journey along the course of the river Chubut. He started on 14th October, 1885, from Rawson settlement on the lower Chubut, and directed his course to the upper part of the river, which had never been surveyed. After tracing the river to its source and exploring the country round, he turned southwards, and travelling along the eastern slope of the Cordillera, returned through the valley of the Sengel, a tributary of the Chubut, to the settlement on 8th February last. The Sengel had already been followed in 1880 by Moyano, who discovered the lakes Colhue and Musters. It is expected that the reports of Lieutenant-Colonel Fontana will add considerably to our somewhat imperfect knowledge of the eastern slopes of the Cordillera, besides giving entirely new information about the upper course of the Chubut.

GEOGRAPHICAL EDUCATION: MEASURES ADOPTED BY THE COUNCIL.

Since the close of the Society's Exhibition of Educational Appliances in the winter months, the subject of the further action of the Council with reference to the improvement of Geographical Education in this country, has been under careful consideration. The recommendations of the Education Committee were submitted to the Council at their last meeting on the 28th of June, and after further discussion and amendment they were adopted in the following form:—

The President shall, on behalf of the Council, address the Vice-Chancellors of the Universities of Oxford and Cambridge on the importance of providing for a representation of Geography in our Universities similar to that which it possesses in the leading Universities of the Continent, and especially of Germany; and he shall submit to the Vice-Chancellors the following alternative schemes, which indicate the direction in which the Council think that they may best be able to co-operate with the Universities.

1. That the Council should appoint (with the approval of the Vice-Chancellor or his delegates) a Lecturer or Reader in Geography, who should deliver courses of lectures at both Universities, arranged so as to suit students in the Honour Schools. The salary of the Lecturer to be paid by the Council; and the University to accord him, as far as practicable, the status of a Reader attached to the University.

2. That each University should join with the Council in supplying funds for a Readership at a salary not exceeding 300*l.* per annum. The Reader to be appointed by a Committee on which the Royal Geographical Society should be represented.

The President is to express also the willingness of the Council to appoint delegates to discuss these or any alternative schemes which may be suggested on behalf of the University, such, for instance, as the recognition of special proficiency in dealing with the geographical aspects of the various subjects of Honour Examinations in the Universities.

The President will further state that in the case of either of the above schemes taking effect, the Council are prepared to award in alternate years at each University an Exhibition, value 100*l.*, to be spent in the geographical investigation (physical or historical) of some district approved by the Council, to a member of the University of not more than eight years' standing, who shall have attended the Geographical Lecturer's courses during his residence. The Exhibitioner to be selected by a sub-committee, to consist of the Lecturer and two resident members of the University and two members of Council, and to communicate the results of his investigations to the Royal Geographical Society.

In the event of the sub-committee in any year considering it undesirable to award the Exhibition, the funds thus released may be devoted to two prizes of 50*l.* and 25*l.* respectively, to be offered to members of the University of the same standing, for an Essay on a Geographical Subject, the conditions of which would be laid down by the Council. The balance of the 100*l.* to be reserved to provide a fee for the adjudicator or adjudicators.

The Council contemplate that the Lecturer or Readers appointed should from time to time deliver lectures in London, which they do not doubt would be quite compatible with the discharge of University duties. They desire to leave the arrangements for such lectures for subsequent consideration.

A donation of 30*l.* for the present year will be made in aid of the Geographical Lectures in the University extension courses (Oxford).

The following proposals to be communicated to the President of the Council of Education, and his concurrence requested in the arrangements necessary for carrying them into effect, subject to any modifications in detail he may think desirable:—

The Council of the Society are prepared to offer a first and second prize (to consist of Atlases or Books) and eight Honorary Certificates to

the pupil teachers in their fourth year passing the best examination in Geography, in each of the ten General Districts. The result of the examination, with a copy of the paper set, to be communicated to the Council by the Education Department.

The Council would offer further prizes of two Scholarships of 20*l.* and 10*l.* respectively to the two best among the ten first prize-takers.

The Scholarships to be awarded either on the Report of the Education Office, which would be asked to submit the papers of the successful scholars for the inspection of the Council, or the ten first-prize papers to be sent in to the R.G.S.'s officers, and the Scholarships awarded by them.

The monthly 'Proceedings' of the Society to be sent to Public School Libraries, the total not exceeding 40.

Travellers or geographers capable of giving instructive geographical lectures to be put into communication with the Head Masters of Public Schools where occasional lectures are given to the students.

As a first step in carrying out that part of the Council Resolutions which relates to the Universities, the following letter has been addressed to the Vice-Chancellor of Oxford by Lord Aberdare, President of the Society:—

LONDON, *July* 9, 1886.

MY DEAR VICE-CHANCELLOR,

The Council of the Royal Geographical Society have on two previous occasions (in 1871 and 1874) addressed memorials, of which copies are enclosed, to your predecessors, urging the claims of geography to further recognition by the Universities.

They have recently undertaken an inquiry into the position of geography in English and Continental education. The result has been unfavourable to England; and there has been a general concurrence of testimony, according with their own strong conviction, that the most effectual step towards the removal of our inferiority would be the establishment in our Universities of Chairs or Readerships similar to those held in Germany, viz. by Karl Ritter at Berlin, and Professors Peschel and Richthofen at Leipzig.

So much of human knowledge and human interests is bound up with the relations and interaction of the physical conditions of the earth, the study of which is practically embraced in geography, that there are few branches of education which do not present a geographical aspect, and which do not therefore offer a field for instruction in geography in combination with some other subject.

It is unnecessary to insist upon the close connection of history and geography, or upon the importance of a knowledge of the physical conditions of the various regions of the world, to those who engage in the conduct of our political affairs.

Without the comprehensive study of the earth, for which English-

men, as a people, have the largest opportunities and the least preparation, physical students would fail to grasp the true character and relations of the various sciences of observation, such as anthropology, geology, botany, meteorology, &c.

As geography already holds a statutable place in the studies of the University, it seems to us that the courses of a Reader or Professor in Geography might easily, by consultation with the examiners, be so arranged as to fit in with the requirements of scholars in the Honour School, their establishment serving rather to complete the present University system of instruction than to introduce a new element into it.

The Council of the Royal Geographical Society are so fully convinced of the national importance of placing geographical science on a sound footing, and of the necessity of some action at the Universities in order to obtain this result, that they have approved the proposals submitted by their Education Committee, enclosed herewith, which they beg you to take into your favourable consideration, and to submit at the earliest opportunity to the proper authorities.

The length of time for which the Society should undertake to make a contribution out of its funds towards a Geographical Chair or Readership will be further considered whenever your University may be prepared to accept our proposition in principle, and to discuss in detail the plans proposed.

Believe me, my dear Vice-Chancellor,

Sincerely yours,

ABERDARE,

President.

To the Vice-Chancellor
of the University of Oxford.

REPORT OF THE EVENING MEETINGS, SESSION 1885–6.

Fourteenth Meeting, 28th June, 1886.—The Right Hon. LORD ABERDARE, President, in the Chair.

PRESENTATION.—*W. H. Freeman, Esq.*

ELECTIONS.—*Samuel Lee Bapty, Esq.; John E. Cracknell, Esq.; Captain H. C. Everill; Edwin Hanson Freshfield, Esq.*, B.A.; *Lieutenant Gerald C. A. Marescaux*, R.N.; *William Melhuish, Esq.; Robert Felix Ryland, Esq.; Lieutenant Richard Belton Sayce*, R.N.; *William Anstruther Thompson, Esq.*

The following paper was read by the author:—

"Exploration of the Ruins and Site of Copan, Central America. By Alfred P. Maudslay, Esq.

Will be published, with map and plans, in a subsequent number of the 'Proceedings.'

This Meeting concluded the Session, 1885–6. At its close the Society adjourned to November next.

The following letters have been received since the last meeting of the Council:—

1. *From* Major A. W. Greely, U.S.A.

Washington, *June 23rd*, 1886.

Dear Sir,—I have the honour and pleasure to acknowledge the receipt of the Founder's Medal for 1886, awarded to me by the President and Council of the Royal Geographical Society.

While expressing my appreciation of the great honour which this award confers on me, I must also add my great gratification that, while conforming to the custom which gives credit to the brain that plans, the Royal Geographical Society has none the less acknowledged at the same time the hand which executes.

Thanking your distinguished President and no less distinguished Council for the handsome mention of Lieut. Lockwood's great services, and for its generous appreciation of my efforts to enlarge the bounds of human knowledge, especially as regards geography,

I have the honour to be, most sincerely,

Your obedient servant,

A. W. Greely.

H. W. Bates, Esq.,
Assistant-Secretary R.G.S.

2. *From* Sergeant D. L. Brainard, U.S.A.

Office of the Chief Signal Officer,
Washington, *July 7th*, 1886.

Dear Sir,—I am in receipt of your letter of June 10th, stating that the Back Grant for the year 1886, in the form of a testimonial watch, and a Diploma, have been awarded me by the Council of the Royal Geographical Society in recognition of my services in connection with the geographical work of the (late) Lady Franklin Bay Expedition.

I received the Diploma on the 30th of June, but the watch did not arrive until this afternoon.

I desire to express to the members of your honourable Society my great obligation and deep feeling of gratitude for being remembered and recognised, and to extend to them, through you, my sincere and heartfelt thanks for this substantial evidence of their appreciation of my labours in the Arctic regions. In acknowledging this tribute of your Society, it is but just to say that without a previous knowledge of the splendid achievements of Captain Beaumont, R.N., in 1876, on the west coast of Greenland north of Repulse Harbour, and of which enduring monuments remain in the form of maps, sketches, and clear comprehensive descriptions, I doubt if Lieut. Lockwood and myself could have attained the high northern latitude which after weeks of arduous toil we accomplished.

I conclusion, I will state that to be commended by your distinguished Society is the highest honour that I could wish to be accorded, and that these testimonials of their approval of my work will ever be cherished and highly prized as pleasant mementoes of the existing friendship and spirit of honest emulation between Great Britain and the United States in furthering Arctic exploration and research.

I am very truly yours,

D. L. Brainard,
Sergeant U.S.A.

H. W. Bates, Esq.,
Assistant-Secretary R.G.S.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—21st May, 1886: M. A. Germain in the Chair.—The Minister for Foreign Affairs forwarded on behalf of the author the second part of M. Verbeek's work on the eruption of Krakatau.—A communication was read from M. Vladimir Yakchitch, chief of the statistical department of Servia, containing information regarding the population of Servia, which in December 1884 numbered 973,079 males and 928,039 females, or together 1,901,118.—M. Joseph Martin sent an extract from 'L'Invalide Russe' announcing that the itinerary of the journey made last autumn by M. Martin in the least known part of Eastern Siberia, viz. between the Lena and the Amur, has just been published in 6 sheets on the scale of 1 : 168,000. The map had been prepared by the cartographical section of the Russian staff under the personal supervision of the traveller.—A letter dated 17th February, 1886, from Stanley Falls, was read from the Rev. George Grenfell, giving a sketch of his voyage along the Kassai in the steamer *Peace*.—The Minister of Public Instruction forwarded a report with reference to M. A. Thouar's third journey on the Pilcomayo —M. J. Jackson, the Librarian, laid on the table his report for the year 1885, upon the state of the library. Additions of 1473 volumes and 253 maps had been made during the year. The number of periodicals was 765, against 642 in the previous year. The Society's collection of the portraits of travellers and geographers had been increased to 1850, while the number of photographic views had been more than doubled in the course of the year; at the end of 1884 there were 2018 photographs forming 103 series; at the end of 1885, 4351, forming 309 series.—M. Ferdinand de Lesseps made a statement with regard to the history of the Panama canal and the present position of the undertaking.—A manuscript map of the Reian Basin was presented by M. Cope Whitehouse, together with some account of his recent surveys there.—M. A. Germain read a paper on the deviation from the vertical on the south coast of France. M. A. d'Abbadie, of the Institute, also spoke on the subject.—In conclusion, M. Aubry, engineer of mines, gave an account of his scientific mission to Shoa and the country of the Gallas.

——— 4th June, 1886: M. A. Germain in the Chair.—The death of M. Arthur Grasset, who had been a member of the society for twenty-five years, was announced. The Chairman stated that M. Grasset had bequeathed to the Society the sum of 200*l*. (5000 francs), and expressed the hope that the funds of the Society would be further increased.—His Imperial Highness Archduke Ludwig Salvator, presented to the Society a copy of his work entitled 'Lose Blätter aus Abazia,' and Major-General T. Stebnitzki forwarded from St. Petersburg the 40th volume of the memoirs of the military topographical section of the Russian staff. The Librarian of the Society called attention to a magnificent presentation of ancient books by M. Léon Dru. Dr. Rouire presented on behalf of M. Vaffier a collection of photographic views taken in Tunis last year. M. Vaffier accompanied Dr. Rouire on his scientific mission in Tunis. The photographs, which number over 300, include views of the little known region lying between Kairuan, Lake Kelbiah, and the sea. The collection possesses considerable ethnographical and archæological interest, containing numerous portraits of the natives and views of Roman ruins. Among the latter may be mentioned one of the town of Segermes (the ancient Upenna).—A letter was read from Vicomte de Brettes, in which he states that he is awaiting the instructions of the Minister of Public Instruction to depart on a fresh mission to the Argentine Chaco, which he will survey with a view to future colonisation. He intended to start from France alone, relying upon the Argentine Government for an escort.—A report was read upon the expeditions made during the years 1884–6 in Southern Gran Chaco.—M. Adrien

Chaigneau who had just returned from a visit to the south of Chili and Araucania, wrote from Valparaiso in April last to the effect that the Government was trying to induce colonists to settle in Araucania by grants of land and building materials. The French colony there was the most advanced and numbers 150 families; the Germans, however, were the most numerous, with a population of nearly 3000. —In conclusion, Dr. Maurel gave an account of the scientific mission to Cambodia, with which he was charged by the Minister of Public Instruction at the end of 1884. He spent six months in Cochin-china, and six in Cambodia, his researches in the latter country being the most important part of his mission. After describing fully the geography and hydrography of the country, he gave some ethnographical notes, illustrated by a large collection of interesting objects. The dwellings of the natives are constructed of bamboo, and built on piles in consequence of the frequent inundations. They have only one floor, which is divided into several compartments, some of which are reserved exclusively for the women and children. Their furniture is of the most primitive description, consisting of a table, a mattress, some bamboo stools, and spittoons. Both men and women wear the same clothing, the "sampot," a large band of cloth. The women wear their hair short. The people are strongly addicted to the use of opium, tobacco, and betel. Dr. Maurel looks forward with confidence to the future of the country.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Baedeker, K.—Italy. Handbook for Travellers. Second part: Central Italy and Rome. Ninth revised edition, with 8 maps, 31 plans, a Panorama of Rome, and a View of the Forum Romanum. Leipsic, Karl Baedeker; London, Dulau & Co., 1886: 12mo., pp. lx. and 414. Price 6*s*. [Presented by Messrs. Dulau & Co.]

——— Northern Germany. Handbook for Travellers. Ninth edition, revised and augmented. With 32 maps and 42 plans. Leipsic, Karl Baedeker; London, Dulau & Co., 1886: 12mo., pp. xxxiv. and 460. Price 7*s*. [Presented by Messrs. Dulau & Co.]

Zapiski Imp. Russk. Geogr. Obsh. Tom. 16, No. 1. Poezka po Laplandii. D. N. Bukharoff. Memoirs of Russ. Geogr. Soc. Gen. Geogr., vol. 16, No. 1. A Journey in Lapland in the Autumn of 1883. St. Petersburg, 1885: pp. 345, with 2 maps.

The author's special object was to study the conditions of life of the Russian, Finnish, Norwegian, and Swedish Lapps occupying the frontier lands of Russia and Norway. Prevented by his official duties from travelling in summer, the season usually chosen for visiting Lapland, M. Bukharoff only started in September, when the first snow had fallen at Vardö. He hoped, however, to see the country before its physical features were too deeply covered to be recognised, and at all events acquaint himself with the migratory Lapps, who about this time return from their sea-fisheries to take up their quarters for the winter in the inland districts on the borders of Finland. Diverging from the route commonly taken by tourists viâ Vadsö, Neuborg, Saidu, and then up the river Tana, M. Bukharoff decided upon following the river Páza up stream to Lake Enareh, leaving further plans to after-consideration. Having completed his preparations on the 9th of September, he left the town of Vardö on the postal-passenger steamer and arrived early in the morning at Vadsö. Thence on the same day he started by another steamer for the Russo-Norwegian

frontier, at the church of St. Basil and Gleb, the most northerly Russo-Greek church in the world, consecrated in 1874.

The first chapter is devoted to a full description of the Lapps in the district of the river Páza, their habits of life, their fishing and hunting. A contrast is drawn between the administrative systems of Russia and Norway in dealing with their Lapp subjects, greatly in favour of the last-named power, which selects some of its best officials for service in this country, and pays them good salaries.

A boat voyage up the Páza, at all seasons difficult to navigate, owing to frequent cataracts and rapids, is late in autumn rendered particularly hazardous by the falling temperature and unsettled weather. M. Bukharoff gives a lively description of perils undergone, and pays a high tribute of admiration to the courage and endurance of his Lapp boatmen. These hardy fellows never hesitated to plunge into the icy torrent and tow the boats past the dangerous rapids, often wading breast high in the water. They never murmured at their task, their compulsory bathing in the frost, and expected no special reward for their exertions, thankful for the glass of cognac given to restore circulation.

The last fifteen miles to Lake Enareh had to be performed on foot through dense boulder-strewn pine forests, already deep in snow. Arrived at this lake, M. Bukharoff hired a boat to take him to its south-western extremity, and his third chapter is devoted to a description of the district of Enareh, which forms the most northern part of Finnish Lappmark, comprising an immense but very thinly populated area, between 68° and 70° N. lat. The inhabitants are divisible into three categories:—1. Settled—Fastboonde or Nybyggare; 2. Fishermen—Fiskerlappar (elf-lappar); and 3. Migratory—Fieldlappar. This division is the result of natural causes, for when the migratory Lapp, from some cause or other, loses his reindeer, he usually seeks for other means of satisfying his love for a free roving existence, and takes to fishing, removing from place to place in his search for richer fisheries. By degrees he begins to accustom himself to settled habits and to have an idea of territorial ownership. Finally, he becomes Fastboonde or Nybyggar (i. e. settled) and receives a grant of land from the Government. Many details are given concerning these Lapps in the districts of Lappmark visited by the author, whose route lay through Tovaniemi, Uchioki (Utsjoki), Polmak, Karashok, Munionisko, Enontekis, Kettileh, Uleaborg to St. Petersburg. On the river Tana he came across an Englishman, who had built himself a lodge in this solitude, and passed from six weeks to two months every year here for the salmon-fishing.—[**E. D. M.**]

ASIA.

Bastian. A.—Indonesien oder die Inseln des Malayischen Archipel. II. Lieferung. Timor und umliegende Inseln. Berlin, Dummler, 1885: large 8vo., pp. lxxiv. and 116, 2 plates. (*Dulau*: price 4*s.* 6*d.*)

This is the second part of the work, the first part of which was noticed in 'Proceedings R.G.S.,' vol. vi., N.S., p. 424.

Cotteau, Edmond.—Voyage aux Volcans de Java. Extrait de l'Annuaire du Club Alpin Français, 12e vol. 1885. Paris, 1886: 8vo., pp. 35. [Presented by the Author.]

Radde, Dr. Gustav.—Reisen an der Persisch-Russischen Grenze. Talysch und seine Bewohner. With illustrations in text, 4 plates and a map. Leipzig, 1886: pp. xvi. and 450. (*Dulau*: price 15*s.*) [Presented by the publisher.]

Talysh, the country described in the volume before us, is the narrow strip of territory lying along the south-eastern coast of the Caspian. Part of it, as far south as Astara, was included in the Russian empire by the treaty of Gulistan (1813), while all beyond is Persian, Talysh bordering with Ghilan. To the investigation of this country Dr. Radde, the well-known director of the museum at Tiflis, has devoted several years of travel, and now publishes the results of his observations. The first chapter of his book contains a general geographical description of the country, its mountains and rivers. The mountains form a continuation of the Alps of Ghilan, the "Albruz" *par excellence*,

with which they are geologically closely associated. The rivers unite to form four principal and a number of smaller streams, some of which reach the sea while others drain into the dreary expanse of the Mogam plain north of Talysh, and not a few lose themselves in the swamps known to the Russians under the name of "Mortsi." The climate is warm and humid, the annual temperature at Lenkoran in lat. 38° 46′ N. and long. 48° 51′ E. averaging 14°·4 Cels. (58° Fahr.) while the rainfall (1314 millim. = 51 inches) is much greater than at other places on the west coast, such as Baku and Derbend. In the second chapter the author describes his journey from Tiflis to Lenkoran with excursions to the copper-mines and smelting works of Kedabeg in the Elizabethpol district, owned and worked by the Brothers Siemens, and to the Shamkhor valley. He next takes us southward to Astara, calling at Shah-agatch, the residence of the once independent, now vassal, native princes, and the centre of what was till lately a flourishing silk industry. He describes the cool and airy summer dwellings at Archevan, raised on wooden pillars to avoid paludial exhalations and thickly thatched with reeds to resist the sun's rays, but without walls, so as to afford the maximum of air with the minimum of heat. Having varied his experiences with a boat voyage on Kaladagna lake, flooded at times by the Caspian, the author rides into Astara, described as a neglected corner of the Russian empire, notwithstanding its custom house and large transit traffic with Persia.

From Astara, Dr. Radde turned westward into the mountains, ascending the valley of the river of the same name till he gained the well-forested heights of Shindan Kala, and the still loftier alpine region of Kus-yurdi (Maiden Camp) 8000 feet above sea-level. Hence an uninterrupted view is disclosed over the plain of Ardebil and the majestic snow-flaked Savalan rising to the W.S.W.

At Ardebil Dr. Radde found the vine cultivated at a height of 4500 feet above the sea in lat. 38° 14′ 58″ N. A large trade is done here with Russia in dried fruits, yet notwithstanding this and its great natural advantages, Ardebil is falling into complete decay from which even the splendid mausoleum of the Sufi Shahs is not exempt. Dr. Radde ascended Mount Savalan to a height of about 13,000 feet, visiting the summer camping grounds of the various tribes of Shah Sévenzi (Sivantsi), much addicted to robbery and murder, who nevertheless are rich enough to purchase immunity for their misdeeds from Persian officials. Ardebil was Dr. Radde's farthest south. The remaining chapters of his book describe his return to Lenkoran and journeys to the north of this place and to the islands along the south-west shore of the Caspian. His observations on the flora and fauna are exceedingly interesting and contain much that is valuable. These, however, are more fully treated in the special work noticed below.

——— Die Fauna und Flora des Südwestlichen Caspi-Gebietes. Leipzig, 1886: pp. viii. and 425, 3 plates. (*Trübner*: price 15*s*.)

This volume forms a separate work on the special scientific results of Dr. Radde's travels in the south-western districts of the Caspian. It includes 1. Vertebrata. 2. Arthrozoa. 3. Mollusca, and lastly 4. Plantæ. Various scientists have shared in the labours of preparing the volume which appears to be very complete and carefully done.—**E. D. M.**

[Russia.]—Izvestiya of the Russian Geogr. Soc., vol. xxii., part 1, 1886.

This number contains: Botanical researches in the Kalmuk steppes. A. Krasnoff.—Diminution of water in the Aralo-Caspian lowlands, with map. N. Yadrintseff.—Recent observations on medium terrestrial density. J. Stebnitsky.

Thornton, Edward.—A Gazetteer of the Territories under the Government of the Viceroy of India. Revised and edited by Sir Roper Lethbridge, C.I.E., and Arthur N. Wollaston, C.I.E. London, W. H. Allen & Co., 1886: 8vo., pp. viii. and 1070. Price 28*s*.

AFRICA.

Farini, G. A.—Through the Kalahari Desert: A Narrative of a Journey with Gun, Camera, and Note-book, to Lake N'gami and back. London, Sampson Low & Co., 1886: 8vo., pp. xx. and 475. Price 21*s*.

A detailed account of the author's recent journey in the Kalahari, the results of which have already been laid before the Society in the form of a paper read at the Evening Meeting on March 8th, 1886. In the Appendix will be found descriptions of the Flora, Reptiles, Insects, Birds, Mammalia, and Geology of the Kalahari, besides a Table of Distances. There are 46 illustrations (mostly from photographs), also a plan of the Hundred Falls of the Orange River, and a map of the Author's route.

AMERICA.

Dent, Charles Hastings.—A Year in Brazil; with Notes on the Abolition of Slavery, the Finances of the Empire, Religion, Meteorology, Natural History, &c. Ten full-page illustrations and two maps. London, Kegan Paul & Co., 1886: 8vo., pp. xvii. and 444. Price 18*s*. [Presented by the author.]

Mr. Dent went out to Brazil in 1883 to survey for a new railway. His time was mainly spent in South and Central Minas Geraes, and this volume contains the journal of the incidents and observations during his journeys. Nearly one half of the volume consists of appendices, containing useful information in various departments, geography, religion, slavery, finance, meteorology, natural history, botany. There is a section on the Theory of Evolution, which seems as much out of place as it is out of date. There is a map of the province of Minas Geraes and Espiritu Santo on the scale 1 : 2,977,000, and another on a larger scale of the Watersheds and Upper Valleys of the rivers Pará, Paropéba, and Das Velhas. There are a few lithographic illustrations.

Janvier, Thomas A.—The Mexican Guide. New York, Scribner & Sons, 1886: 8vo., pp. ix. and 310. (*Trübner*, price 12*s*.)

Mexico is rapidly increasing in favour as a tourist and winter resort for North Americans. In the present handy and well-printed volume Mr. Janvier gives such information as he himself felt the want of when he first went to Mexico. In the first part he gives all necessary information as to how to get to Mexico, provisions for the journey, and other points required for the comfort of travellers. The second part, descriptive and historical, is mainly devoted to the City of Mexico and its environs, with sections on short trips into the interior. There is a good map of the City of Mexico, and another of the environs.

Powell, J. W.—Third Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1881–82. Washington, Government Printing Office, 1884: folio, pp. lxxiv. and 606, illustrations. [Presented by the Director of the U.S. Bureau of Ethnology.]

The first part of this volume is occupied by the Report of the Director of the U.S. Bureau of Ethnology, Mr. J. W. Powell. The second part consists of a series of papers on anthropological subjects, as follows:—Notes on certain Maya and Mexican Manuscripts, by Cyrus Thomas; on Masks, Labrets, and certain aboriginal customs, by William H. Dall; Omaha Sociology, by J. Owen Dorsey; Navajo weavers, by Dr. Washington Matthews; Prehistoric textile fabrics of the United States, derived from Impressions on Pottery, by W. H. Holmes; Illustrated Catalogue of a portion of the Collections made during the field season of 1881, by W. H. Holmes; Illustrated Catalogue of the Collections obtained from the Pueblos of New Mexico and Arizona in 1881, by James Stevenson. These papers are accompanied by 44 plates, some of which are coloured, besides numerous smaller illustrations; there is also a map showing the Migrations of the Omahas and cognate tribes.

Schlagintweit, Robert von.—Die Pacifischen Eisenbahnen in Nordamerica. Petermann's 'Mitteilungen,' Ergänzungsheft Nr. 82. Gotha, Justus Perthes, 1886: pp. (4) and 31. Price 2 Mark 60 Pf.

After an historical introduction, Herr Schlagintweit gives a detailed account of each of the six Pacific railways, following this up by a section showing the various connections between them. There is a map, from Stieler's Hand-Atlas, on the scale of 1:7,500,000.

U.S. Geological Survey.—Fourth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1882–83. By J. W. Powell, Director. Washington, Government Printing Office, 1884: folio pp. xxxii. and 473.—Fifth ditto, 1883–84. Washington, 1885: pp. xxxvi. and 469.

In the former of these volumes the scheme for a new complete Geological Survey of the United States is described; the leading points of the plan we have already given (Proc. R.G.S., May 1886, p. 334). The Report of the Director summarises the work done under the various sections: topography, geology, palæontology, chemistry, and statistics. This is followed by the Administrative Report of the heads of the various field parties. The greater portion of the volume is devoted to special purposes. The most important of these from a geographical point of view is that on Hawaiian Volcanoes, by Capt. C. E. Dutton. After a sketch of the geography of the Hawaiian Islands, Capt. Dutton describes the results of his own investigations of the great volcanic region of these islands, discussing in a special chapter what he calls "the dark problem of the volcano." He certainly throws light on the subject, but hesitates to formulate any definite conclusion. Volcanic action and regional uplifting are really associated phenomena, and results of the same cause. When we come to inquire into the cause of elevatory movements of the earth's surface we only encounter a mystery. No solution has ever been given which does not go to pieces under criticism." Other accompanying papers are more purely geological. Besides a large map of the United States showing the surveyed areas, and special maps of the Hawaiian Islands, there are many page-plates and woodcuts in the text.

The volume relating to 1883–4 contains the usual general and departmental administrative reports. Of the accompanying papers, that of most geographical interest is on the "Topographic Features of Lake Shores," by Mr. G. K. Gilbert. After dealing shortly with the subject of Earth-shaping, Mr. Gilbert treats of Wave-work, under the heads of Littoral Erosion, Littoral Transportation, Littoral Deposition. Sections are then devoted to the Distribution of Wave-wrought Shore-features; Stream-work—the Delta; Ice-work—the Shore-wall; Submergence and Emergence; the Distribution of Shore-features—Cliffs, Terraces, Ridges; the Recognition of Ancient Shores. The other papers in the volume are "The Requisites and Qualifying Conditions of Artesian Wells," by Thomas C. Chamberlain; "Preliminary Paper on an Investigation of the Archæan Formation of the North-western States," by Roland D. Irving. There are two large maps, exhibiting the progress made in the geographical survey and the present state of knowledge relating to the areal distribution of geological groups, and maps illustrating the papers on Lake Shores and Glaciers; upwards of 50 plates and 143 woodcuts.

[Venezuela.]—Dr. W. Sievers: Reisebericht aus Venezuela, in 'Mittheilungen der Geog. Gesellschaft in Hamburg,' 1885–6, Heft ii. pp. 81–148.

This is the continuation and conclusion of Dr. Sievers's journeys in Venezuela during the year 1885, to which we have already referred. He devotes his concluding paper to the discussion of some general aspects of the history, geography, and ethnology of the country.

ARCTIC.

[Jan Mayen.]—Die Internationale Polarforschung 1882–83. Die Oesterreichische Polarstation Jan Mayen, ausgerüstet durch S.E. Graf Hanns Wilczek, geleitet vom K. K. Corvetten-Capitän Emil Edlen von Wohlgemuth. Beobachtungs-

Ergebnisse, herausgegeben von der K. Akademie der Wissenschaften. I. Band. Mit 4 Karten, 15 Tafeln und 10 Holzschnitten. Wien, Karl Gerold's Sohn, 1886: 4to., pp. 118, 26, 50, 202, 76, and 18. [Presented by the Royal Academy of Sciences, Vienna.]

These are really four separate memoirs bound together. They contain the most important results of the year's work of the Austrian Polar Station in Jan Mayen in 1882–3. There is first an account by Captain Wohlgemuth of the methods of observation adopted, and a summary of the leading results in the various departments in which observations were carried out. This is followed by a section on the astronomy of the expedition by Lieutenant Gödel-Lannoy. Then come fifty pages devoted to a survey and description of the island, with observations on its glaciers by Lieutenant Boldva. As might be expected, considering the main object of the expedition, the largest section is that which deals with the meteorological observations, by Lieutenant Sobieczky. This is followed by sections on the temperature and specific gravity of sea-water by Professors Luksch and Wolf; the chemistry of sea-water by Herren Kliemetschek and Sobieczky; and tidal observations by Lieutenant Boldva.

GENERAL.

Colonial and Indian Exhibition, London, 1886. Handbooks, Catalogues, &c.

Notes on Perak, with a Sketch of its Vegetable, Animal, and Mineral Products. London, William Clowes & Sons, 1886: 8vo., pp. 33, map.

Official Handbook. History, Productions, and Resources of the Cape of Good Hope. Edited by John Noble. Cape Town, W. A. Richards & Sons, 1886: 8vo., pp. viii. and 328, maps and illustrations.

Catalogue of the Exhibits of the Colony of the Cape of Good Hope. London, Richards, Glanville & Co., 1886: 8vo., pp. 131.

Natal. Official Handbook. London, William Clowes & Sons, 1886: 8vo., pp. 108, map.

Dominion of Canada. A Guide Book, containing Information for Intending Settlers, with illustrations. Published by the Government of Canada. Sixth edition. Revised and corrected to date. Ottawa, the Department of Agriculture, 1885: 8vo., pp. x. and 137.

Official Catalogue of the Canadian Section. Published under the Authority of the Hon. Sir Charles Tupper, G.C.M.G., C.B. London, McCorquodale & Co., 1886: 8vo., pp. 299, map.

The Immigrant in Ontario; the Premier Province of Canada. Brantford, Ontario, Watt and Shenston, 1884: 8vo., pp. 64, map.

The Canadian North-West, and the advantages it offers for Emigration Purposes. By Prof. Henry Tanner. [Second edition.] London, George Kenning, 1886: 8vo., pp. 48, map and illustrations.

Dominion of Canada. Province of Nova Scotia. Information for Intending Settlers, (Compiled by the Nova Scotia Immigration Society.) Ottawa, Department of Agriculture, 1884: 8vo., pp. 32.

Dominion of Canada. Province of British Columbia. Information for Intending Settlers. Ottawa, Department of Agriculture, 1884: 8vo., pp. 32, map.

New Brunswick as a Home for the Farmer Emigrant. Ottawa, Department of Agriculture, 1884: 8vo., pp. 54.

New South Wales, its Progress and Resources. First edition. Sydney, Thomas Richards, 1886: 8vo., pp. iv. and 46, map.

New South Wales. Official Catalogue of Exhibits from the Colony. Sydney, T. Richards, 1886: 8vo., pp. 478.

South Australia: a Sketch of its History and Resources. A Handbook compiled by John Fairfax Conigrave. 8vo., pp. vi. and 176, map and illustrations.

Catalogue of the Exhibits in the Queensland Court. Brisbane, J. C. Beal; London, William Clowes & Sons, 1886: 8vo., map.

Illustrated Handbook of Victoria, Australia. Melbourne, John Ferres [1886]; large 8vo., pp. 108, map and illustrations.

Catalogue of Exhibits in the Victorian Court. Melbourne, J. Ferres: 8vo., pp. viii. and 208.

Colonial Museum and Geological Survey Department. Handbook of New Zealand. By James Hector. With maps and plates. Fourth edition, revised. Wellington, G. Didsbury, 1886: large 8vo., pp. 120.

——— New Zealand Court. New Zealand Geological Survey Department. Detailed Catalogue and Guide to the Geological Exhibits, including a Geological Map and General Index to the Reports, and a List of Publications of the Department. Wellington, G. Didsbury, 1886: large 8vo., pp. 101.

Handbook to Fiji, and Catalogue of the Exhibits. London, William Clowes & Sons, 1886: 8vo., pp. 59.

[The above Colonial Handbooks, &c., were presented by the Executive Commissioner for each Colony.]

[Geodetic Institute.]—Publication des Königl. Preuss. Geodätischen Instituts. Uebersicht der Arbeiten des K. Geodätischen Instituts unter Generallieutenant Z. D. Dr. Bæyer, nebst einem allgemeinen Arbeitsplane des Instituts für das nächste Decennium. Berlin, 1886: 4to., pp. [2], 40 and 9.

General Helmert, who has succeeded General Bæyer as Director of the Prussian Geodetic Institute, appropriately devotes his first publication to a sketch of the work accomplished under General Bæyer, and a summary of the work which it is hoped will be undertaken in the next ten years.

Jung, Karl Emil.—Deutsche Kolonien, mit besonderer Berücksichtigung der neuesten deutschen Erwerbungen in West-Afrika und Australien. Zweite vermehrte Ausgabe. Leipzig, Freytag, 1885: 8vo., pp. xlviii. and 302. (*Trübner.*)

In this little work Dr. Jung gives an account not only of German Colonies proper, but also much useful statistical and other information concerning Germans in foreign countries, especially in North America.

[Russia.]—Zapiski Voienno-topographicheskago otdiéla glavnago shtaba, part 40. St. Petersburg, 1885. Separate paginations for each section. 2 maps and 5 plates.

This part of the memoirs of the military topographical department of the Staff Corps contains in the first section a report on the geodetic, astronomical, topographical, and cartographical work executed by the corps of military topographers in 1882; in the second section: 1. Chronometrical expeditions executed in 1875, 1876, 1877, 1878, and 1881, by Colonels Lebedef and Bonsdorff and Lieut.-Colonel Solimani in the provinces of the Ural and Turgai (with a map). 2. Report on the astronomical labours of the expedition to the Pamir in 1883 (with map), by Lieut.-Colonel N. Pomerantzeff. 3. Astronomical labours executed in 1881 and 1883 by Colonel Miroshnichenko in the military district of Omsk. 4. Horizontal circle of Pulkovo (with engravings), by Capt. Witkowsky. 5. Astronomical positions fixed in the Transcaspian province and Khanats of Khiva and Bokhara in 1884, by Capt. Gedeonoff. 6. Chronometrical expedition from Irkutsk to Verkholensk and Nilowa Pustyn in 1882 by Capt. Polanowsky. 7. Capt. Solimani's chronometrical expedition in 1882 in the Khanat of Khiva. Capt. Gedeonoff.

Among the cartographical works noticed in section 1 are the following:—A special map of European Russia, scale 10 versts to 1 inch (edited by

Major-General Strelbitsky); a 3 verst scale topographical map of the kingdom of Poland, the trans-frontier region, the governments of Novgorod and Kurland, with additions to the eastern sheets of the governments of Orloff, Kursk, and Kharkof; a map of the environs of St. Petersburg for the manœuvres, scale 1 verst to the inch; a 2 verst map of the western border lands; a skeleton map of Poland for entering in strategical information; a strategical map of Central Europe, 40 versts to the inch; a military road map of European Russia; a map of the environs of Constantinople and the Bosphorus on a scale of 1 verst to the inch; a map of the eastern part of the Balkhan peninsula; a survey of Montenegro, 1 verst to the inch; a map of the Turko-Montenegrin frontier, natural scale 1 : 50,000; a map of the Orenburg steppe, 20 versts to the inch; a map of Asiatic Russia on 8 sheets, scale 100 versts to the inch; a map of Persia, 20 versts to the inch; a second edition of a map of North-western Mongolia according to latest surveys; besides other works, including a table of heights in Central Asia.—[**E. D. M.**]

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

EUROPE.

France.—Carte de ——, dressé par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, 1886. Sheets: IX.—18, Châteaubriant; X.—17, Château-Gontier; X.—18, Segré; XV.—8, Abbeville (Ouest); XVI.—9, Amiens; XVI.—10, Breteuil; XIX.—19, Clamecy; XX.—19, Avallon; XXIII.—21, Poligny; XXIII.—26, La Tour du Pin: XXIV.—20, Besançon; XXIV.—21, Salins. Price 7*d.* each sheet. (*Dulau.*)

Oesterreichsch-Ungarischen Monarchie. — Specialkarte der ——. Scale 1 : 75,000 or 1 geographical mile to an inch. K. k. Militär geografisches Institut, Wien, 1886. Sheets: Zone 13, Col. XXIV. Szikszó u. Tisza-Dob; 16—XXI. Nagy Káta und Monor; 16—XXIX. Gaura und Galgó; 17—XXI. Cegléd; 17—XXVIII. Zilah; 19—XXIV. Békés-Csaba; 20—XXII. Kistelek und Szegedin; 20—XXIII. Földeak und Mezöhegyes; 21—XXII. Török-Kanizsa; 26—XIX. Gradačac und Brčka; 33—XIV. I. Lissa (Vis); 33—XV. Lesina; 34—XVI. Curzola und Lagosta; 34—XVIII. Ljubinje und Slano; 35—XVIII. Ragusa. Price 1*s.* 4*d.* each sheet. (*Dulau.*)

Salzkammergut.—Karte vom ——, enthaltend die Umgebung von Gmunden, Ichl, Hallstatt und Aussee, Salzburg, Hallein, Zell am See, Berchtesgaden und Reichenhall. Von R. Maschek. Scale 1:150,000 or 2 geographical miles to an inch. Wien, Artaria & Co. Price 4*s.* (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued during the month of June, 1886.

1-inch—General Map—Scotland, 98 (Hills). 1*s.* 9*d.*

6-inch—County Maps:—

ENGLAND AND WALES: **Brecknockshire**: 39 S.E.; 1*s.* **Cambridgeshire**: 26 S.W., 58 N.W.; 1*s.* each. **Cardiganshire**: 12 N.W; 1*s.* **Carmarthenshire**: 26 N.W., 34 N.E.; 1*s.* each. **Cornwall**: 13 S.E.; 1*s.* **Derbyshire**: 49 N.W., S.W., S.E.; 1*s.* each. **Devonshire**: 41 N.E., 114 S.W.; 1*s.* each. **Dorsetshire**: 6 N.W., N.E., 7 N.W.; 1*s.* each. **Glamorganshire**: 43; 2*s.* 6*d.* This sheet contains Cardiff. Glamorganshire is now complete on the 6-inch scale. **Gloucestershire**: 41 N.E., 44 S.E., 47 S.W.; 1*s.* each. **Herefordshire**: 17 S.E., 27 N.W., 28 S.W., 34 N.E., 35 N.W.; 1*s.* each. **Huntingdonshire**: 18 S.W., 22 N.W.; 1*s.* each. **Lincolnshire**: 2 S.W., 27 N.W., 152 N.W., N.E., 153 N.W.; 1*s.* each. **Monmouthshire**: 37; 2*s.* 6*d.* **Montgomeryshire**: 5 N.W., S.E., 9 N.E., S.E., 33 N.W., N.E.,

S.W.; 1s. each. **Norfolk**: 6 N.E., S.E., 10 N.W., 11 N.W., S.W., 16 S.W., 61 N.E.; 1s. each. **Northamptonshire**: 3 N.W., N.E., 4 N.W., 8 N.E., 14 N.W.; 1s. each. **Nottinghamshire**: 32 N.E., S.E., 1s. each. **Shropshire**: 29 N.W., N.E., 30 N.W., S.E., 50 S.E.; 1s. each. **Somersetshire**: 30 S.E. and 31 S.W. on one sheet, 43 N.W., 72 N.E., 73 N.E., 74 N.W., S.W., 84 N.W., N.E., 85 N.W.; 1s. each. **Staffordshire**: 32 S.E.; 1s. **Suffolk**: 22 N.W., 74 S.E.; 1s. each. **Warwickshire**: 34 N.W., N.E., S.E., 35 N.W., S.W., 38 N.W., S.W., S.E., 39 N.E., 40 N.E., S.E.; 1s. each.

25-inch—Parish Maps:—

England and Wales: **Cambridgeshire**: XXVI. 12, 15, 16, 4s. each; XLII. 5, 3s. **Derbyshire**: XX. 13, 4s. **Devonshire**: XVII. 15, XXVII. 1, XL. 4, 6, 3s. each; LII. 10, 4s.; LXIV. 15, LXXXIX. 3, 3s.; LXXXIX. 4, 4s.; LXXXIX. 7, 11, XC. 12, 15, 16, 3s. each; XCIX. 7, 2s. 6d.; XCIX. 8, 3s.; XCIX. 11, 15, 2s. 6d. each; XCIX. 16, CVII. 3, CXXXII. 13, 3s. each; Area Books: Lewtrenchard, 4s.; Luffincott, 1s.; North Petherwin, 2s. 6d.; Werrington, 1s. 6d. **Gloucestershire**: XXV. 14, XXXIII. 2, 5s. each; XXXIII. 7, LXV. 12, LXVI. 6, LXX. 10, 3s. each. Area Books: Brookthorpe, King's Stanley, Pitchcombe, Stanton, Winstone, Woolstone, 1s. each. **Herefordshire**: VI. 1, 5, XIII. 11, 3s. each. **Leicestershire**: XXXVIII. 3, 7, XLIV. 8, XLV. 2, 3, XLVI. 6, 8, 3s. each. Area Books: Dishley, with Thorpe Acre Garendon and Knighthorpe, Garthorpe, Kirby Bellars, Wymondham, 1s. each. **Lincolnshire**: L. 12; 3s. **Montgomeryshire**: XXXVII. 3, 4s.; XLIII. 14, XLVIII. 4, 8, 11, 12, 3s. each. **Norfolk**: XXIII. 16, 3s.; XXIX. 10, 4s.; XXIX. 11, XXXVI. 8, 3s. each. **Northamptonshire**: II. 10, 3s.; II. 11, 4s.; II. 13, 15, 16, VI. 6, 9, 13, VII. 2, 5, 9, 10, 13, XVI. 7, XVII. 2, 11, 12, XIX. 3, 4, 7, 8, 11, 12, 16, XX. 5, 3s. each. **Nottinghamshire**: III. 7, V. 12, 15, VI. 1, 3s. each; VI. 2, 3, 4s.; VI. 4, 3s. each; VI. 5, 4s.; VI. 6, 3s.; VI. 7, 4s.; VI. 8, 10, 11, 3s. each; VI. 12, 14, 4s. each, VI. 15, 16, VII. 1, 3s. each; VII. 5, 4s.; VII. 6, 9, VIII. 3, 8, 10, IX. 8, 9, 10, 13, 14, 3s. each; X. 5, 4s.; X. 12, 13, 14, 3s. each; XIII. 13, 4s.; XIII. 14, 3s.; XXXV. 3, 6s. 6d. Area Books: Fiskerton cum Morton, Kneeton, Syreston, 1s. each. **Radnorshire**: XIX. 1, 3s. **Rutlandshire**: XIV. 6, 9, 3s. **Somersetshire**: VI. 1, 2, 3s. each; VI. 6, 4s.; VI. 7, XX. 6, XXXIX. 5, 5s. each; XXXIX. 16, XL. 2, 11, 16, 4s. each; XLII. 1, LIV. 10, 3s. each. Area Books: Easton in Gordano, 1s. each. **Staffordshire**: LX. 1, LXIII. 8, 12, 3s. each; LXIII. 15, 4s. **Suffolk**: XXXVI. 5, XLII. 5, 3s. each. LXIV. 13, 4s.; LXXI. 1, 3s. Area Books: Bartham, Bedfield, Bradfield, St. Clare, Coddenham, Crowfield, Feltham, Hesset, Little Welnetham, North Cove, Saxtead, Tostock, 1s. each. **Warwickshire**: III. 1, 3s. **Wiltshire**: VII. 12, VIII. 6, 7, 8, X. 12, XII. 3, 8, 10, 12, 16, XIII. 4, 3s. each; XIII. 8, 5s.; XV. 4, 6s. 6d.; XIX. 4, 14, 3s. each; XX. 12, 4s.; XX. 13, 3s. **Worcestershire**: Area Book: Lower Mitton, 1s.

Town Plans—10-feet scale:—

England and Wales: Bath, XIV. 1, 2, 3, 7, 8, 10, 11; 2s. each. Chippenham, XXVI. 2, 13, 15; 2s. each. Stamford, II. 5, 18, 22; CL. 8, 9, 14, 15, 19, 20; CLI. 5, 1, 2, 6, 7, 8, 13, 21; 2s. each. Weston Super Mare, IX. 11, 22, 23; IX. 15, 5, 8, 9, 14, 20; IX. 16, 1, 6, 7, 12, 16, 17; XVI. 3, 5, 10, 14, 15, 19; XVI. 4, 1, 6, 11; 2s. each.

(*Stanford, Agent.*)

ASIA.

Turkestan Russe.—Carte Géologique du ——, dressé en 1881 par les Ingénieurs des Mines G. Romanovsky et I. Mouchketow, d'après leurs propres observations faites de 1874 à 1880, edition 1885. Scale 1:1,260,000 or 17·3 geographical miles to an inch. Six feuilles. St. Pétersbourg, 1886.

The difficulty which would possibly present itself to many students of geology, in consequence of the lettering of this excellent map being in Russian character, is obviated by an explanation with reference to the distinguishing numbers, symbols, and system of classification being given on the title-page in French. The observations from which this map has been compiled extended over a period of six years, the particulars of which are given in M. Mouchketow's work entitled 'Turkestan, a Geological and Orographical Description, from materials collected during travels undertaken in the years 1874 to 1880,' and which was noticed at some length in the Society's 'Proceedings' of May last. The map is a beautiful specimen of cartography, and considering the number of colours which have to be used, the contrasts are well chosen.

AFRICA.

Central-Ostafrika.—Karte von ——, nach authentische Quellen und unter Benutzung des Materials der Deutsch-Ostafrikanische Gesellschaft entworfen und gezeichnet, von D. Paul Engelhardt und J. Wensierski. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Berlin, Engelhardt. Price 3s. (*Dulau.*)

Old Calabar River.—United Presbyterian Missionary Map of ——. Scale 1:930,000 or 12·7 geographical miles to an inch. W. & A. K. Johnston, Edinburgh and London, 1886.

This map is the work of the Rev. Mr. Buchanan, the Secretary of the United Presbyterian Foreign Missions Board, and the material used by him has been derived from the note-books of the missionaries of his Society, or

from sketches taken by them on the spot. The result of Mr. Buchanan's labour in this direction has been a valuable addition to our geographical knowledge of the district to the north-west of the Cameroons mountains.

AMERICA.

America.—Neueste Karte von ——, mit den Haupt- Dampf- und Segelschiff-Kursen, sowie mit den grösseren Eisenbahnen und den unterseeischen Telegraphen, von C. F. Baur. Scale 1 : 4,000,000 or 55·5 geographical miles to an inch. Stuttgart, Maier. 6 sheets. Price 8*s*. (*Dulau.*)

Brazil.—Routen-Aufnahme der Expedition von den Steinen von Cuyabá bis zum Rio Batovy, 26 Mai bis 13 Juli 1883. Von Dr. Otto Clauss. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 8. Justus Perthes, Gotha. (*Dulau.*)

Canadian Pacific Railway System. A Map of the ——. Scale 1 : 5,100,000 or 68 geographical miles to an inch. London, 1886: published by E. Stanford.

This map has appeared very opportunely, as the Canadian Pacific Railway has just been opened for public traffic. It shows very clearly all the connections with the main line from New York, Halifax, Chicago and other cities in the Canadian Dominion and United States, and also the possible extension of traffic by means of ocean steamers with China, Japan, our Australian Colonies and New Zealand.

A good map of British North America has long been wanted, as those which have been published even at recent dates, do not show the physical features of a vast portion of the country, or simply repeat the errors of former maps; in this instance, however, the material gathered by the officers engaged in the railway survey have been used, and in consequence, we have a map which, for general purposes, indicates in a sufficiently clear manner all the prominent features of the Canadian Dominion. An inset map of England and Wales, drawn on the same scale as the larger map, conveys a good idea of the magnitude of the work which the Canadian Government has just brought to a successful termination.

United States.—State of Mississippi, scale 1 : 760,660 or 10·42 geographical miles to an inch. 1885.—State of Iowa, scale 1 : 760,660 or 10·42 geographical miles to an inch. 1885.—State of Wisconsin, scale 1 : 760,660 or 10·42 geographical miles to an inch. 1886.—State of Illinois, scale 1 : 887,680 or 12·16 geographical miles to an inch. 1885.—State of California, scale 1 : 950,898 or 13·03 geographical miles to an inch. 2 sheets. 1885.—State of Colorado, scale 760,660 or 10·42 geographical miles to an inch. 1885.—Indian Territory, scale 1 : 760,660 or 10·42 geographical miles to an inch. 1885.—Territory of Arizona, scale 1 : 950,898 or 13·026 geographical miles to an inch. 1885.—Territory of Dakota, scale 1 : 760,660 or 10·42 geographical miles to an inch. 2 sheets. 1885.—Compiled from the Official Records of the General Land Office and other sources. Department of the Interior. General Land Office, Washington.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in May and June 1886.

No.			Inches.	
915	m	=	28·0	England, Milford haven :—Pembroke reach. 2*s*.
1170*b*	m	=	1·0	England, west coast :—Holyhead to Liverpool, eastern sheet. 2*s*. 6*d*.
2635	m	=	0·15	Scotland, west coast. 2*s*. 6*d*.
1543	m	=	1·75	England, east coast :—Yarmouth and Lowestoft roads. (Plans, Yarmouth haven. Lowestoft harbour.) 3*s*.

No.			Inches.	
144	m	=	6·0	Mediterranean:—Gibraltar. 1*s.* 6*d.*
918	m	=	1·55	West Indies:—Antigua. 2*s.* 6*d.*
1927	m	=	3·9	Central America, west coast:—Corinto harbour (port Realejo). 1*s.*
650	m	=	1·65	Africa, east coast:—Innambán river. Kiliman (Quilimane) river. 2*s.* 6*d.*
2483	d	=	0·2	Atlantic and Indian oceans with the western portion of Pacific ocean. 4*s.*
2764	m	=	0·04	Australia:—Coral sea and Great Barrier reefs, sheet 2, showing the Inner and Outer routes to Torres strait. 2*s.* 6*d.*
2766	m	=	0·04	Pacific ocean:—North-east coast of New Guinea, with Bougainville, New Britain, New Ireland, Admiralty islands, and off-lying reefs. 2*s.* 6*d.*
329	m	=	0·37	Solomon islands:—Bougainville strait. 2*s.*

2236 Cape Yasoun to fort Anakria:—Plan added, Poti harbour.

282 Newfoundland, St. Genevieve bay to Orange bay:—Plan added, Ariègo bay.

683 St. Mary island:—New plan of port St. Mary.

14 Red sea anchorages:—Plan added, Mersa Halaib anchorages.

2123 Orangerie bay to Bramble haven:—Plans added, Pitt bay. Samarai or Dinner island. Hoop Iron bay.

856 Anchorages in New Hebrides:—Plan added, Rhanone anchorage.
(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
1170*b*	Holyhead to Liverpool, eastern sheet	New chart, Holyhead to Liverpool, eastern sheet	1170*b*
2635	Scotland, west coast	New chart, Scotland west coast	2635
1543	Yarmouth and Lowestoft roads ..	New plan, Yarmouth and Lowestoft roads	1543
144	Gibraltar	New plan, Gibraltar	144
2066	Boon point to Pelican island ..		
2157	Pelican island to Carlisle bay ..	New chart, Antigua	918
2099	Carlisle bay to St. John's harbour		
1927	Port Realejo	New plan, Corinto harbour (port Realejo)	1927
650	Kilimani or Quilimane river ..	New plans, Innamban river, Kiliman river	650
2483	Indian ocean	New chart, Atlantic and Indian oceans	2483
2764	Coral sea and Great Barrier reefs, sheet 2	New chart, Coral sea and Great Barrier reefs, sheet 2	2764

2788, 2787, 2786, 2785, 2784, 2783, 2782, 2781, 2780, 2779, 2775, 2777. St. Lawrence river above Quebec, 12 sheets.

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2040. England, south coast:—The Solent. 2682. England, Bristol channel:—Nash point to New Passage. 1951. England, west coast:—Liverpool bay. 1406. North sea:—Dover and Calais to Orfordness and Scheveningen. 2114. Baltic sea:—The Kattegat. 2842*a*. Baltic sea, western portion. 2300. Baltic sea:—Stiernö point to Fiäderäg and Stor Fiärd to Gamla Karleby. 2241. Baltic sea:—Entrance to Gulf of Finland. 2741. France, west coast:—Pertuis D'Antioche, Environs de la Rochelle, &c. 2648. France, west coast:—Coubre point to Les Sables D'Olonne. 2611. France, north coast:—Dieppe to Boulogne. 80. Spain, west coast:—Ferrol harbour. 1520. Mediterranean, Greece:—The Piræus. 2230. Black sea:—Bosporus to cape Kaliakara. 250. Mediterranean, north coast of Africa:—Fratelli rocks to Mehediah. 2456. North America, east

coast:—Muskeget channel. 2843*a* to *f*. North America, east coast:—Chesapeake bay, 6 sheets. 2563. North America, east coast:—Delaware river. 444. Cuba, south coast:—Port Xagua or Cienfuegos. 483*a*. West Indies:—Trinidad island, western portion. 643. Africa, south coast:—Port Natal. 40. India, west coast:—Karachi harbour. 933. Eastern Archipelago, Java:—Batavia road. 941*b*. Eastern Archipelago, western portion. 2660*a*. China sea, southern portion. 1954. China, south coast:—Mirs bay. 2562. China, south sea:—Canton river. 1985. China, east coast:—Hai-tan strait. 363. Australia, east coast:—Keppel bay and islands. (*J. D. Potter, agents.*)

North Atlantic Ocean.—Pilot Chart of the ———, July 1886. Published monthly at the Hydrographic Office, Navy Department, Washington, D.C. J. R. Bartlett, Commander U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

Berghaus' Physikalischer Atlas (Begründet 1836 von Heinrich Berghaus), 75 Karten in sieben Abteilungen, enthaltend mehrere hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, Dr. Karl v. Zettel, herausgegeben von Prof. Dr. Hermann Berghaus. Zweite Lieferung. Inhalt: Nr. 37, Jährliche Regenmenge. Nr. 46, Vegetationszonen der Erde. Nr. 70, Die Völker Ozeaniens. Gotha, Justus Perthes, 1886.

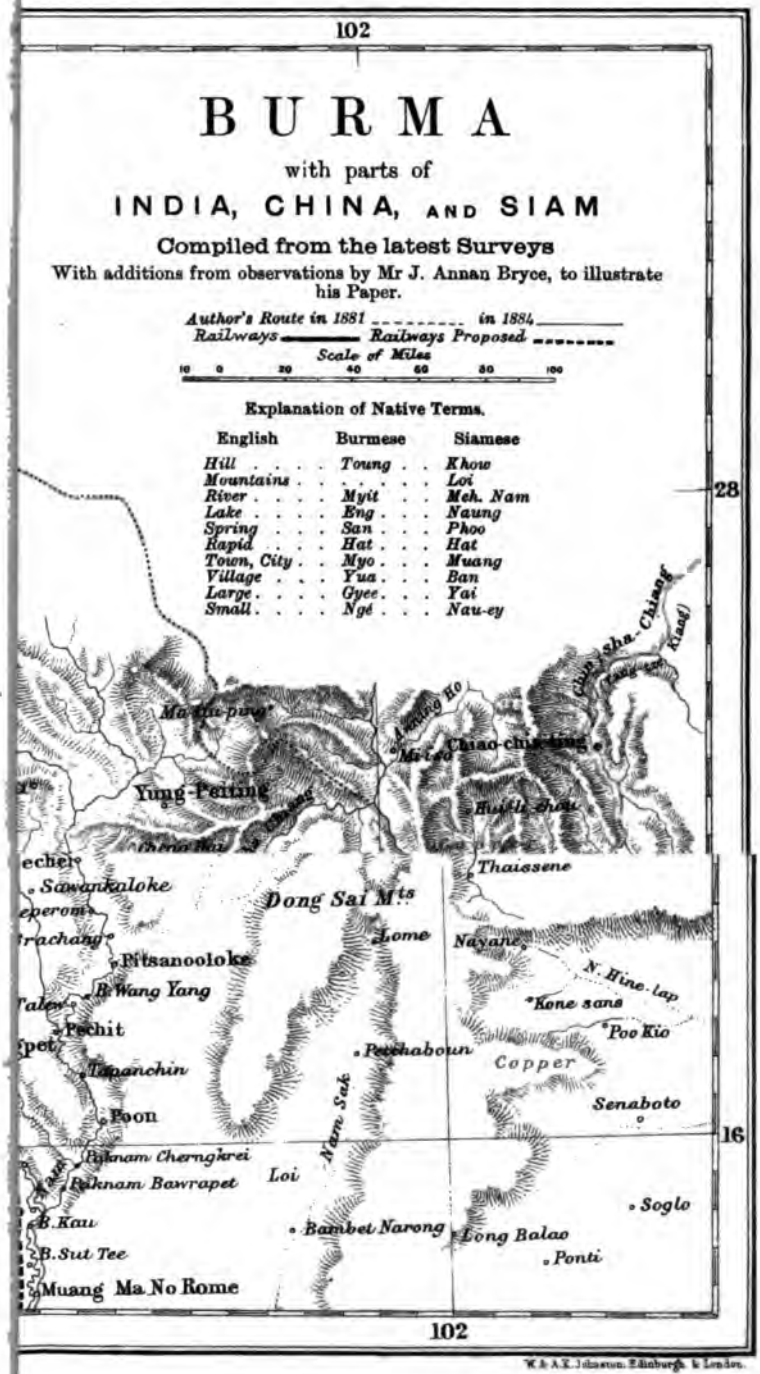
This is the second issue of this atlas. The maps are well drawn, but the distortion in the two elliptical maps in a great measure destroys their value, Eastern Asia being compressed out of all form, and almost beyond recognition.

EDUCATIONAL.

Fritzsche, G. E.—Nuovo Atlante Geografico ad uso delle Scuole Primarie e Secondarie disegnato sotto la direzione dell' Ingegnere Dottore Luigi Hugues da G. E. Fritzsche. Fascicolo Primo. 12 Carte. Roma, Torino, Milano, Firenze: Ditta G. B. Paravia e Comp. 1886. Price 2*s*. 6*d*. (*Dulau.*)

This is the first issue of an atlas for the use of primary and secondary schools, which is in course of publication; the maps being drawn by Herr G. E. Fritzsche under the supervision of Professor Luigi Hugues. The arrangement of this atlas is as follows:—The first twelve pages are devoted to physical and political statistics; next comes a sheet containing planispheres, diagrams showing the area of continents, the heights of mountains, and lengths of rivers; then in the following order physical and political maps of Europe and Italy, on which there are inset maps showing the mean temperatures, rainfall, and population of Europe, and at the foot of each of the principal maps there is a diagram illustrating the relief. The remaining maps are those of Asia, Africa, North and South America, Australia, and Polynesia. They are all very well executed, but the contrast in the colours intended to indicate nationalities, or the possessions of European countries in Africa, might with advantage be more marked. Taken as a whole, this issue of the 'Nuovo Atlante Geografico" is a creditable production and its price, 2*s*. 6*d*., is very moderate.

Johnston, Ruddiman & Co.—The "World" series of Class Lesson Maps and Diagrams. No. 5. View of Sphere. 6. Curvature of the Sea. 30. Scotland, Chief Railways and Canals. 31. Scotland, Minerals, Agriculture, and Manufactures. 37. Ireland, Chief Railways and Canals. 38. Ireland, Minerals, Agriculture, and Manufactures. 51. British Isles, Counties and Chief Towns. 52. British Isles, Counties and Chief Towns, *Test*. 53. British Isles, Physical. 54. British Isles, Populations by Counties. 55. Lake District. 56. Lake District, *Test*. Ruddiman Johnston & Co, Limited, Edinburgh and London. Prices 1*s*. to 2*s*. 8*d*. each.


102
BURMA
with parts of
INDIA, CHINA, AND SIAM
Compiled from the latest Surveys
With additions from observations by Mr J. Annan Bryce, to illustrate his Paper.
Author's Route in 1881 _____ in 1884 _____
Railways ——— Railways Proposed - - - - - -
Scale of Miles
10 0 20 40 60 80 100
Explanation of Native Terms.
English Burmese Siamese
Hill . . . . Toung . . Khow
Mountains . . . . . Loi
River . . . . Myit . . Meh. Nam
Lake . . . . Eng . . . Naung
Spring . . . San . . . Phoo
Rapid . . . . Hat . . . Hat
Town, City . . Myo . . . Muang
Village . . . Yua . . . Ban
Large . . . . Gyee . . . Yai
Small . . . . Ngé . . . Nau-ey
28
Ma-rie-pure
Yung-Peiting
Mi-tso
Chiao-chi-tsing
Huifli Shan
Thaissene
Dong Sai Mts
Lome
Nayane
N. Hine. lap
Kone sans
Poo Kio
Pechit
Petchaboun
Copper
Senaboto
Pitsanooloke
R. Wang Yang
Tapanchin
Poon
Paknam Chengkrei
Paknam Bawrapet
R. Kau
R. Sut Tee
Muang Ma No Rome
Nam Sak
Loi
Bambet Narong
Long Balao
Soglo
Ponti
16
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Leland Stanford, Jr.
UNIVERSITY

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Cruises in Melanesia, Micronesia, and Western Polynesia, in 1882, 1883, *and* 1884, *and Visits to New Guinea and the Louisiades in* 1884 *and* 1885.

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(Read at the Evening Meeting, April 12th, 1886.)

Map, p. 608.

THE cruises of which I propose to give some account were the following:—

In 1882 the New Hebrides and the Banks Islands were visited. Towards the close of the same year, during a second cruise, visits were paid to several islands of the Solomon group, to New Britain, and to the Duke of York Islands.

In 1883, in the course of a very extended cruise, I called at Rotumah, Sophia Island, the Ellice, Gilbert (or Kingsmill), and the Marshall groups, the Pelew Islands, both sections of the Great Caroline Archipelago, New Britain, the Duke of York Islands, and some of the north-western Solomons.

In 1884 my duties took me to Keppel Island, or Niu-to-bu-tàbu, to Samoa or the Navigators' Archipelago, and to the several divisions of Tonga or the Friendly Islands. Later in this year, the ship which I commanded, the *Espiègle*, accompanied Commodore Erskine during the proclamation of the British Protectorate over South-eastern New Guinea, and I touched at many places on the coast between Port Moresby and Dinner Island, and also at Basilaki (Moresby Island), and Teste Island.

In 1885, in H.M.S. *Dart*, I visited the Louisiades and Woodlark Island, the eastern part and also the north-eastern coast of New Guinea as far as Cape King William, and the little-known Rook and Long Islands.

It is not worth while to occupy your attention with the details of the several archipelagoes visited. A glance at a fair-sized chart

of the Western Pacific will exhibit their position, extent, and composition much more clearly than even a long description in words. It may be remarked that, in the above enumeration of cruises, no mention has been made of Fiji, to which I paid several visits. It has now been for years a British colony with a settled government: among its population are nearly 4000 whites, and accounts of it have been too often published to render necessary a repetition of them here.

Of the other archipelagoes the New Hebrides has, perhaps, been the most frequently described in print; and we have, amongst others, an interesting narrative of a cruise in the waters of the group by Captain Albert Markham when in command of H.M.S. *Rosario*. The greater part of it is, however, still but little known, and very few strangers have seen anything of the interior of the larger islands. Of late years the group has been invested with a special interest as being one of the principal areas of the so-called "labour trade," and the scene of outrages on the "labour traders" and of retaliatory expeditions against the natives. The southern section of the group, composed of Aneiteum, Tanna, Erromanga, and Sandwich or Vaté, with a few smaller islands, is sufficiently remote from the equator to enjoy, during at least several weeks of the year, a far from disagreeable climate. Being in the southern hemisphere, January and February are the hottest, and July and August the coolest months. The temperature in the shade ranges from about 62° in the latter, to about 92° in the former months, as established by observations made at Futuna (or Erronan) by the Rev. J. Copeland. I experienced some very pleasant weather at Havannah Harbour in Sandwich, and at Aneiteum in August 1882; but in my journal I can find no record of a lower day temperature than 68°, and only one entry of a night temperature, at the former place, as low as 66°. In the more northern islands, Api, Ambrym, Mallicolo, Espiritu-Santo, Aurora, Pentecost, and Aoba, the climate is warmer and more generally humid. As a rule the climate is not favourable to white men, especially in the northern islands, and bad fevers are very common.

The scenery of the southern section is the more varied. The foliage is not so dense as in the northern, and especially in Erromanga and Sandwich, the step-like terraces of the hill-sides, faced with precipitous bluffs of coralline limestone, are surmounted with broad belts of open grass-covered country which has been proved to afford excellent grazing for horned cattle. On the lee sides of the northern islands coco-nut trees grow in enormous numbers; and north of Mallicolo, the grass country is rare. There are several active volcanoes. That in Tanna is the best known, but about two years ago a party of officers from H.M.S. *Dart* reached the summit of the loftier volcano of Ambrym. There are few good harbours in the New Hebrides. Havannah Harbour is spacious and sheltered from all winds, but the entrances are narrow and the water inconveniently deep; Vila has the same defects. On the lee sides

of most of the islands there are many fairly snug anchorages, but these are not secure in the hurricane season, which lasts from about the middle of December to the beginning of April.

The inhabitants of the New Hebrides are Melanesians, divided into a multitude of independent and usually hostile tribes. On several islands there are communities of Polynesians, some of whom—as shown by their complexions—have preserved, amongst their Melanesian neighbours, their purity of descent. One of the difficulties of communicating with the natives is due to the immense variety of languages, which renders it impossible to obtain the services of an interpreter likely to be of use in more than a single district. This difficulty has seriously impeded the work of the missionaries of the Presbyterian Church who labour in the islands from Ambrym southwards, and of the Anglican Melanesian Mission, who have taken spiritual charge of the northern islands, the Banks group, and the Solomons. The necessity of confronting this difficulty has been advantageous to linguistic science, for the Rev. Dr. Codrington, of the Anglican Mission, has recently published a learned work on 'The Languages of Melanesia.' As a rule, white men and natives communicate with each other by means of a very singular jargon, like the "pigeon English" of China, known as "sandal-wood English," or the "*bêche de mer* lingo," designations which explain its origin. Bearing in mind who the devisers of this dialect were, it is not surprising that a prominent characteristic should be the frequent interpolation into a sentence of exceptionally vigorous profanity. This the native linguist utters without a suspicion of its being improper. A few phrases, without the ingredient just mentioned, will convey an idea of what the jargon is. "That fellow man he no good" = "That is a bad man." "That fellow woman Mary belong a me" = "That woman is my wife." "Big fellow yam he stop Tanna" = "Large yams grow in Tanna." This "pigeon" is the universal mode of communication between white men, except missionaries, and islanders throughout the South-western Pacific, and is used by both Englishmen and foreigners. I have even heard the oath administered to Melanesian witnesses in a French court of justice at Noumea in the following terms:—"Me talkee true, me no tell lie, me no gammon; me," raising the right hand to the sky, "swear." At many places even this imperfect method of conversing is unknown, but so intelligent and such adepts in gesture language are the natives, that they understand, and make themselves understood by, a stranger much more thoroughly than the inexperienced would expect.

At the time of my visit there were, including the wives and children of the missionaries, between eighty and a hundred white residents in the group. There are probably now fully a hundred in all. Aneiteum is completely Christian; and the natives are amongst the most devout of believers. A more attentive congregation than that attending the church at Port Inyang it would be impossible to meet with. The

members carry with them to worship small libraries of devotional works, which require bags and baskets for their conveyance. On other islands progress has been made, progress with which the missionaries themselves are dissatisfied, but which appears very surprising to a stranger who can discern the difficulties of the situation. As a rule, a missionary establishment consists of the clergyman and his wife, and perhaps children, and one or two teachers, or subordinate lay missionaries, who are generally natives of other and remote islands. A plain wooden house is brought from New Zealand and put up for the missionary and his family, usually with his own hands and those of his brethren who assemble for the purpose. A church built in the style of the native houses, of reeds and mats, occasionally at the older stations of coral masonry, and a similar edifice for a school, with the comfortable huts of the teachers and the catechumens, complete the buildings of the station.

The other white men in the group follow the occupations of planters and traders. Attempts, in one case on a large scale, were made some years ago to grow cotton, but without much success, on the island of Sandwich or Vaté. The cultivation of maize and coffee has been tried with better results on the same island. The staple vegetable product is *copra*, the dried pulp of the coco-nut. One or two settlers have planted trees for the express purpose of obtaining copra, but there has hardly as yet been sufficient time to see if it will answer. The immense groves of coco-nut trees on Ambrym and Api, for instance, render it unlikely that much deliberate planting will be undertaken for some time to come. But the climate of the northern islands is so humid, that on them the copra has to be artificially dried by fire, which is more costly, in labour and material, than the sun-drying process, and gives a less valuable article for sending to market.

The white "trader" gets permission from the chief of a tribe to settle in his district. The stranger's presence is usually very acceptable to the tribe. He must bring with him a stock of "trade"; that is, tomahawks, knives, handkerchiefs, pipes, tobacco, matches, &c., for purposes of barter. Natives with a trader near them can rely upon a pretty steady supply of those goods of the white man which they had become fond of. A rude hut, except that it contains a rough table and a chair or two differing little from those of the natives, is put up as a residence, and a larger one as a copra store. A few platforms of slender poles raised two or three feet above the ground serve as drying-places for the nuts, the shells of which are split in half, so that the pulp when it shrinks in drying can fall out. On islands where it is necessary to use fire to dry it, the shells form no inconsiderable part of the fuel. The trader is usually the agent of a mercantile firm, which supplies him with a certain quantity of "trade" goods, and receives in return his copra. He has, as a rule, three or four labourers in his employment. Owing to a singular custom or prejudice, these are rarely natives of the

island in which they work. He buys the nuts from his neighbours, and with the assistance of his labourers prepares the copra. On the more savage islands, arms and ammunition, as long as their introduction was allowed (and it is doubtful if it has yet been quite stopped), matches, pipes, and tobacco, are the things commonly given for nuts. The price varies greatly, according to locality and year, but a pipe, a small fragment of tobacco, or a box of matches, is frequently given for a dozen nuts. Every few months a small vessel visits the different stations, bringing goods and supplies of food for the traders, and taking away the copra, which on arrival in Europe is converted into oil, the refuse being used in the manufacture of cake for cattle.

The life of a trader is a hard and isolated one; and undoubtedly the profession comprises in its ranks some very despicable persons who have made the name of "beach-comber" a synonym for a vicious and lazy scoundrel. But I am bound to say that I met among them several honest, industrious, and temperate men who would have done credit to any community.

The New Hebrides natives differ greatly in physical qualities. On Mallicolo there are two distinct races, distinguished by the length and breadth of their skulls. Persons familiar with the group can readily point out an Espiritu-Santo man, a Sandwich man, a Pentecost man, or a Tanna man. The dress differs in nearly every island, and in some is very remarkable, more so on Tanna, on Erromango, on Api, and on Ambrym than would bear public description. The modes of dressing the hair are various. On Tanna it is dyed auburn or nearly gold colour with lime, and is gathered into small thin locks which are wound round with a slender filament like thread. On Sandwich the women shave the skull completely. On Espiritu-Santo they shave it, but leave a broad ridge of frizzled hair in the middle from poll to forehead, like the well-known garniture of the head of a clown. I had the good fortune to witness some Santo ladies making their toilet, which was effected by mutual assistance. The person being dressed had her head shaved with a knife of bamboo, of course without soap or any facilitating lather.

In the New Hebrides the villages are always invisible from the water. Each village as a rule consists of a set of different hamlets or collections of huts. The houses in the various islands differ greatly in architecture, but I always found them beautifully neat and clean. The dead are usually buried at the door of the hut. On Ambrym and some other islands the young unmarried men in a village always sleep in a large house specially set apart for them.

In general it may be said that all the Melanesians who have not been converted to Christianity are cannibals. It is not, however, to be supposed that human flesh is their ordinary diet. It is probable that none partake of it often, and that large numbers have only rare opportunities of doing so. They are almost invariably ashamed of canni-

balism, and will generally conceal their indulgence in it or discontinue it if a white man comes to live among them.

Wars are nearly perpetual, and the non-Christian natives invariably go armed. I have been amongst natives whose custom it was not to lay aside their weapons even to eat, but keeping them in their right hand to take their food in the left. The spear, the bow and arrow, the club, and the tomahawk are all in use in the New Hebrides, but there are many firearms in the hands of the natives. The Tanna men have a high reputation for boldness, and even in ordinary intercourse they have a more independent bearing than most of their neighbours. Native wars are not usually very sanguinary; at least, pitched battles are few. The savage art of war consists in murdering stragglers and making forays to kill women and children, burn down villages, and lay waste plantations.

Nothing struck me more than the great intelligence of the natives of Oceania in general and of the Melanesians in particular. Within the limited sphere of their acquirements whatever they do they do thoroughly. This will be generally admitted. One quality which my experience compels me to credit them with is more likely to be disputed; that is, their truthfulness. I had to conduct more than one long and intricate inquiry, and, difficulties of communication notwithstanding, each resulted in the discovery of the point sought for; whilst the straightforward manner in which the native evidence was given led me often to compare it with that in which white testimony was delivered in the multitude of cases I had had official cognisance of, and usually the comparison was not to the advantage of the latter.

The Melanesians of the Solomon Islands are less known than their neighbours of the New Hebrides. The climate of the group is less favourable to white men. Up to the time of my last visit only three or four traders resided in the whole archipelago; and the system on which the Anglican Mission is conducted does not admit of more than occasional residence on a few of the islands of Bishop Selwyn and his clergy. The enormous influence which that estimable prelate has obtained wherever he is known is convincing proof of the noble qualities which he brings to the furtherance of the cause to which he has devoted his life. It is impossible to exaggerate the high opinion of him held by the officers and men of the squadron on the station, who regard him both as a pious ecclesiastic and an excellent seaman. His zealous and self-denying companions have won the esteem of all who have visited the scene of their labours.

The cool intervals experienced in July and August at Aneiteum or Sandwich are not enjoyed in the Solomons, which, on the other hand, are not visited by hurricanes. The scenery of the islands is often grand, as the mountains are lofty; but the surface of the country is covered with the luxuriant vegetation of the tropics, usually of a deep

green hue, which, beautiful enough in itself, becomes in time somewhat monotonous. The geological structure of the group gives promise of mineral riches in at least some of the islands. In Guadalcanar there are some large rivers, which in the heavy rains pour their turbid floods into the sea, thereby greatly hampering navigation, which, as amongst all coral islands, has to be conducted largely by attention to the colour of the water.

The Solomon islanders are in general an aquatic people. Their canoes, except as New Ireland and New Britain are approached, have no outriggers. They are of graceful shape, of large size, built up of pieces, and with seams "payed" with a sort of vegetable pitch. The villages are usually near the water's edge and unconcealed by trees. The use of firearms is still not very common. But on some islands, notably Guadalcanar, they are expert bowmen. The Savo men make clubs covered with straw plaiting of singularly fine texture and tasteful pattern. Some of the spears are of prodigious length, and are tipped at the end with a human bone cut into a multitude of sharp and brittle points, which break off in a wound and are said to certainly cause death. Having succeeded with some difficulty in purchasing one of these at Tesemboko, a friendly native cautioned me against allowing any one to touch a point even with the finger, saying that if any person did, "My word! he die quick."

New Britain is one of the most beautiful countries in the world. The contours of the lofty mountains are very graceful, and the variety of tints of the rich tropical verdure is as attractive as it is unusual. The dense foliage is interspersed with patches of grass of an emerald hue. At Matupi in Blanche Bay there is an active volcano, a curious volcanic island, and a region of hot springs. I travelled by land once from Nodup to Blanche Bay, and the heat and fatigue were more than compensated by the beauty and varied character of the scenery traversed. The New Britain people go entirely naked. They are not a fine race, and want the activity and vigour of the Solomon islanders. Foreigners have introduced a good many firearms amongst the inhabitants of Blanche Bay and Kambeirah, but as a rule the spear, usually adorned with brightly coloured feathers, is their weapon. They build good houses and make excellent nets and ingenious fishing-baskets. They are the only cannibals I know who are not ashamed of their fondness for human flesh. A German settler told me that overtures were made to him to arrange the purchase of the body of a man who had been accidentally killed by a neighbouring tribe with whom the would-be buyers were not friendly. The reason given was a desire to eat what otherwise might be wasted in a commonplace interment.

The curious and little understood ceremonies of the *duk-duk* are extensively performed in New Britain and the neighbouring Duke of York group. One thing about them is certain, and that is, that those who

are initiated into the mysteries obtain considerable influence over the rest of their tribesmen. There is another very remarkable custom, about which I was given information by the Rev. Mr. Rooney of the Wesleyan Mission, which labours in this part of Melanesia. It may be described as follows:—If A injures B, B burns down C's hut, or makes a hole in his canoe, or sticks a spear in the pathway so that C is nearly sure to run against it. B lets C know that he has injured him, and the reason of it; when C is expected to settle the account with A, the first aggressor. On the whole the New Britain people are the least attractive of all Melanesians whom I know. They are very dirty, and do not possess the skill in fashioning pottery, or carving wooden bowls, of their neighbours in the Solomons and the Admiralty Islands. Yet amongst them I had some very worthy friends. One of them I specially remarked from having been struck with the persistence with which he insisted on observance of the curious Melanesian etiquette, that a person should never be asked his name. The savage has no objection to his name being known, but politeness requires that it should be asked of some one else. The New Britons have a curious money called *dawarra*, made of small shells perforated and strung on fibres of some plant. It is counted by measure of length, and has some of the properties of the money of civilisation, as it owes its value to the rarity of its material, and it can be easily divided into small sums.

At Meoko, in the Duke of York group, there is a large German trading station of the South Sea Company, but it serves principally as a depôt for labourers who are "recruited" in the neighbouring islands for the plantations in Samoa. At Matupi, in New Britain, is the western headquarter station of the Messrs. Hernsheim.

Two white men, Messrs. Farrell and Parkinson, have laid out a plantation for coffee, cotton, and copra, on New Britain, with fair prospects of success, provided the difficulty of obtaining a steady supply of labour can be overcome. A Catholic mission was established a few years ago at Nodup in New Britain, but its existence did not last long. The missionaries believed themselves to have been threatened by the natives, and their principal station was burned down in 1883. In September of that year I brought away the two fathers and a lay brother, who comprised the mission. They were in a complete state of destitution, without clothes and weakened by fever. I met Father Navarre, the amiable and self-denying head of the mission, last year at Thursday Island, where he had halted preparatory to going over to New Guinea.

The Ellice, the Gilbert (or as they are usually called by the seamen, the Kingsmill), and the Marshall groups, are all composed of low, flat islands formed of coral. Some of them are nearly perfect *atolls*, Maraki in the northern Gilberts being perhaps the most perfect in the world. The usual formation is a belt of coral, often of very irregular outline, from which a series of low sand islets rise a few feet, seldom more than

twelve, above the surface of the water. The belt is generally pierced by several passages leading to the lagoon, often navigable by ships of considerable size. In some cases, as at Nukulailai in the Ellice group, there is no navigable passage. Where this is wanting, landing has to be effected in canoes on the edge of the reef on the lee side, and the shallow interior waters of the lagoon have to be traversed by wading. The larger sandy islets on the reef are inhabited and are planted with extensive groves of coco-nut trees. The coco-nut and the pandanus are almost the only trees that grow in these archipelagoes; but in the Marshall Islands there is a kind of bread-fruit which is also found in the other groups, but in smaller quantity.

It seems absurd to speak of the fertility of soil apparently composed almost entirely of sand, nevertheless even amongst these coral archipelagoes there are differences. The Marshall Islands have the most profuse natural growth of ferns and grasses; on the Gilbert Islands there is not even a fern; whilst the Ellice Islands hold an intermediate place between the sterility of the latter and the comparative fertility of the former. It is customary to reproach the natives of Oceania with invincible indolence; and, if it be a fault, I fear they must be convicted of desultoriness and unsteadiness in their work. The amount done in a year would if spread over the whole period give, I believe, a very respectable daily average. The labour expended by the Ellice Islanders in cultivating their lands and growing the huge *taro*, which is the staple of their diet, must have been enormous. The vegetable is planted in vast trenches which look as though they had belonged to some great fortress long ago fallen into ruin. Even with the best implements the excavations would be extremely laborious, but one is lost in astonishment when one finds that many of the taro beds now in existence were excavated by generations in possession only of tools of shell or wood.

In the Gilbert and Marshall groups the fruit of the pandanus is largely used as food; and, of course, in all the groups fish is a common article of diet. The pandanus fruit is preserved for use as sea-stock by the bold canoe sailors of the two more northern archipelagoes. The drupes are separated, dried, and pounded into a dust resembling snuff. This dust is exposed to the sun till a sweet juice exudes rendering it sticky. It is then rolled into broad flat cakes which look exactly like pieces of thick blanket soaked in treacle. These are rolled up and tightly wrapped round with dried leaves and sennitt, much after the fashion in which blue-jackets make up their tobacco. Thus preserved the fruit is not injured by salt water. All the islanders are expert fishermen. Shark's fin being an article of export the shark is eagerly sought for. He is often caught without a hook; a piece of bait is put on the end of a line passed through a noose in a larger line and towed from a canoe. As the shark is seen to follow the bait, it is gradually hauled up till his head and shoulders are past the noose. The latter is then quickly tightened.

Another plan, of which I was told on good authority, is even more remarkable. The sharks are supposed to sleep in rather shoal water under projecting pieces of coral with their heads just protruding. When a Gilbert islander sees one in this position he dives down with a small stick in his hand and gives the fish a tap on the nose, repeating it until the shark, for comfort's sake, changes his position and leaves his tail where his head had been. This is the fisherman's chance, and a second dive with a noose at the end of a line soon makes him master of his game. I am bound to say that I never saw this mode of fishing.

The Ellice islanders are all Christians, having been converted by the missionaries of the London Mission Society. They are inoffensive folk and have no arms. The Nukulailai people declare that they never did have any: but the natives of other islands undoubtedly had some until comparatively recently. They are well educated, can all read, and are most persistent letter writers. No present is more acceptable to them than a few sheets of paper and some pens. In the *Espiègle* we nearly ran out of ink before we got clear of the group. The people are very much under the influence of the resident missionaries, who are all, as far as I saw, natives of Samoa. At Nukulailai we anchored on a Sunday, and the natives had been forbidden to shout "Sail-ho!" the ejaculation which they have learned from sailors, and which all Pacific islanders shout when a ship heaves in sight. At Funafuti there was a single Roman Catholic, a survivor of a former missionary epoch, who was compelled to go to the Protestant church by the intolerant majority, in spite of his protests that, "though his body went his soul did not." I am glad to be able to add that on this coming to the ears of the Rev. M. Phillips, the estimable missionary at Apia, in Samoa, he assured me that he would visit the island and have such persecution, if it really existed, put a stop to.

Some of the islands of the group were nearly depopulated twenty years ago by Peruvian kidnappers, who carried off many natives to work in Peru. As a general rule the population of each island is very small, never, as far as I am aware, exceeding a few hundreds. All are governed by a constitutional sovereign and a *kaupuli*, or parliament. The form of government, in its present state, is to a great extent the work of the missionaries. At Vaitupu I noticed in the *kaupuli* house some curious couches, carved out of single pieces of wood, with four legs and a solid block like a pillow at one end. To my inquiries it was replied that as some members of the assembly are fond of long speeches, the debates are occasionally protracted, and wearied legislators get rather sleepy, so the couches are provided to enable them to slumber in comfort. All the natives wear European clothes of some sort. The men usually put on at least a shirt: the women's dress is peculiar. They wear a long garment of coloured calico, tight round the neck, and reaching in ungirt looseness to the heels. On their heads they put a

curious high-crowned hat, cross-laced with bright ribbons, exactly resembling the head-gear of a brigand in the opera of 'Fra Diavolo.' Ladies of a certain age in the Archipelago are inclined to *embonpoint*; and a crowd of portly dames streaming out of church in their flowing calicoes and brigand hats, always many sizes too small for them, is a sight not soon to be forgotten.

The Gilbert islanders are only partially Christianised. The southern portion of the group is under the London Mission; some of the other islands are under American missionaries, who, however, do not reside in them. Like the Ellice Islands these also were once governed by kings; but in all the southern part regal government has been abolished, and a sort of federal republic has been established in several islands. The natives seem to have an innate capacity for parliamentary institutions. I have been present at several debates amongst them, some of which were so far of importance, that on their issue depended whether we should be at peace or at war with the inhabitants. Nothing could exceed the regularity and decorum of the proceedings, and some of the speakers were assuredly fluent, and apparently eloquent. The islanders are capital sailors, fearlessly visiting distant islands in canoes of large size, not dug out of single trees but built up of pieces. One very remarkable feature of the islands is their dense population. This is especially striking, as the islands are extremely barren.

The weapons of the Gilbert islanders are curious wooden swords and halberts, studded with shark's teeth. They make also complete suits of armour out of coco-nut fibre, stiff hauberks, cuisses of matting, and close-fitting helmets, like those of the crusaders. Firearms have of late to a great extent replaced the old weapons, and the armour has been generally laid aside. It is odd that the custom of the duel should be common amongt the Gilbert natives. Duels are rarely to the death, but a wooden sword bristling with shark's teeth can, to judge from the tremendous scars on many of the men's bodies, inflict very severe wounds.

The Marshall Islands are less known than the Ellice or Gilbert groups. The Archipelago is divided into two chains; the Ralick, or western, and the Radack, or eastern. It is unsafe to dogmatise in ethnological matters, except after minute and careful inquiry, but I hazard the opinion that the Samoan type, plainly to be discerned amongst the Ellice and some of the Gilbert people, becomes less and less apparent as one proceeds further north: and that consequently the Micronesian is, so to speak, purer. The Ellice Islanders use the Samoan edition of the Scriptures; and both they and the southern Gilbert islanders stand probably to pure Samoans as the bulk of the inhabitants of Hispano-America stand to pure Spaniards. Christianity has been introduced into the southern part of the Marshall Archipelago by American missionaries, but in the islands which I visited it has scarcely taken root. King David of Arnho is a baptised Christian. He is able to read and write, and is still an

industrious student of the Bible. Some years ago his desire to take an additional wife was opposed by the missionaries. The result was that the king carried out his polygamous intentions and relapsed into heathenism. The Marshall Island men are tall, the women singularly short. Some of the latter sex, who are of high birth, are very good-looking, and extremely graceful. The men are tattooed on the body and right up to the temples. Those of chiefly family cover the whole body; commoners leave an unmarked patch from the armpit nearly to the waist. The lobe of the ear is perforated, and often greatly distended with an unclosed hoop of wood. When this ornament is not carried, the vacant loop of flesh is hung over the point of the ear. The women tattoo the back of the hand and the forearm nearly to the elbow in tasteful patterns, so that they appear to have on open-worked silk mitts. The male costume is decidedly picturesque. It consists of two enormous tassels of shreds of *vau* bark joined by a plaited strap and disposed round the body so as to form a kilt. It is kept in place by a cord covered with plaiting of pretty pattern, which cord, being often over a hundred feet long, is wound round the waist till it forms a large coil. Chiefs particularly affect great length of cord, which does not improve the wearer's appearance, as it makes the kilt too bunchy. With a coil of moderate size the kilt is very becoming, and recalls the Albanian *fustanella*. The women's dress is composed of two mats worked with devices of great taste. The so-called "Greek key" is common as an ornament at the edges. These mats are bound round with a cord, similar to that of the men, above the hips, leaving a few inches of mat above, while the rest reaches nearly to the ankle. The costume is thus very like a low-necked European gown without sleeves, and though a little stiff for sitting down in, has an attractive appearance when the wearer stands.

The Marshall Island canoes are like those of the Gilbert Islands; but they are larger, and on the sloping platforms built out on each side there are frequently little houses in which three or four of the crew can sleep. The natives are great navigators. They actually make curious charts of thin strips of wood tied together with fibres. Some of these charts indicate the position of the different islands with a surprising approach to accuracy. Others give the directions of the prevailing winds and currents. These are used as instruments to determine the course to be steered, so as to take advantage of the wind and to allow for current drift rather than as charts are used by us. At Kusaie I fell in with the survivors of the crews of five canoes belonging to Milli Atoll who had been drifted from their own island. After being at sea six weeks, during which they lost five hands and had to break up one canoe for firewood to cook some rice, they were driven ashore on Kusaie, by the Christian natives of which they were well treated.

The islands of the Marshall Archipelago are much less thickly populated than the Gilberts. Arnho and Majuro atolls at the time of

my visit were distracted by wars. Wars caused by rival claimants to the chiefly throne are common in these islands. I am glad to say that we succeeded in making peace in both. At Arnho I was afraid that, until the stock of firearms in the hands of the resident traders had been bought up, eagerness to sell them to the natives after my departure would prevent any permanent peace. Later information has shown that these fears were justified. At Majuro also peace was made, and an interview arranged at a spot about midway between the headquarters of the contending armies. The scene was the most interesting and touching that I ever witnessed, and I wish that time allowed me to describe it.

The low atolls of the three groups just spoken of are called by sailors the "Line Islands," from their position with respect to the Equator. In spite of their general unproductiveness the number of coco-nut trees is so large that there is a considerable export of copra. One English and three German firms have nearly the whole business in their hands. There is one American firm also, but its transactions must be much less extensive than those of the English, and of at least two of the German houses. All are represented by resident traders. At Majuro Messrs. Henderson and MacFarlane have a very complete and extensive head-station. At Jaluit the German firms of Hernsheim and Co. and the South Sea Company, the latter at the time of my visit under the style of Capelle and Co., have large head-stations for this part of Oceania.

The contrast between Kusaie and Ponapi in the Carolines and the low atolls of the Marshall, Gilbert, and Ellice groups is striking and agreeable. Both of the former are called by our sailors "high islands," a designation which is soon appreciated by any one who has cruised among the groups mentioned. Kusaie is densely wooded and picturesque. Its soil is very fertile. The people, who only amount to between three and four hundred, are all Christians, having been converted by the American missionaries, who have an important station on the island. The American missionaries are fond of giving to the petty chiefs of the tribes with whom they come in contact the absurd title of king. Tokusa, the chief of Kusaie, which name includes all the islets near as well as the main island of Ualan, is accordingly called king, though his subjects are so few. He speaks English well, and is very intelligent and well-mannered. The natives are straight-haired and rather light-coloured. They paint their canoes a dull red with a pigment made of an ochreous earth found in two caves on Ualan. Their houses are large, with high-pitched roofs and elevated gables. Most of them now wear some article of European dress, but the garb of the country is a broad sash woven of the fibre of an inedible banana, frequently dyed black except at the ends, where there are some bright coloured bars, which make it resemble the silk scarves of the Roman peasantry.

On the little island of Lelé, on which the natives live, there are some interesting ruins, which appear to be those of a fortress with cyclopean walls of large irregular blocks of basalt, 25 to 30 feet thick. There are also canals and artificial harbours. The natives can give no account of them, though King Tokusa told me that he believed they had been constructed by his ancestors. In the splendid island of Ponapi, the inhabitants of which are more barbarous than those of Kusaie, there are even more remarkable ruins. Four-sided platforms stand out of the water, and are composed of layers of hexagonal basaltic prisms, like those of the Giant's Causeway, transversely superimposed one on another, the prisms of a layer being at right angles to those of the one above or below it. These platforms are arranged to form canal streets, and the walls of edifices erected on them are built of basaltic columns in like manner. The ruins are much overgrown with the rich vegetation of the tropics, but enough is visible to disclose the remains of a city, of a second Venice, of whose builders we are ignorant.

Yap, in the Western Carolines, is singularly interesting. The natives are gook-looking and profusely tattooed. The hands and forearms of the women are tattooed with mitts as in the Marshall Islands. The houses are large and built of mats. They stand on an extensive platform of earth revetted with stones, against which is placed the curious stone money of the islanders. This is in the form of huge discs of arragonite, quarried in the Pelew Islands, more than 200 miles away. The discs are like great grindstones, and frequently weigh three tons. People have said on hearing of this money that there was not much risk of its being stolen. Nevertheless an American trader at Yap complained to me that some which had been placed in his charge had been carried off in the night.

I visited two other islands which may be included in the Caroline group. These were Nuguor and Greenwich Island, both low atolls. At Nuguor human sacrifices are still offered; one had occurred about two years before I was there. The inhabitants are of almost gigantic size. They are ruled by two queens, and have retained the tradition of their migration from Samoa and the name of the chief, Vavé, who led it. Greenwich Island is very little known. The inhabitants make *tappa* from the bark of a bread-fruit tree, being, as far as I am aware, the only people dwelling on a low island in these seas who do. The costume of the men is a T bandage formed of a mat almost as fine in texture as muslin.

I visited the Pelew Islands exactly a century after the wreck of the *Antelope*, through which the natives were introduced to the civilised world. On the centenary of the wreck I succeeded in inducing the two principal kings to make a treaty and stop the wars which had long devastated their islands. They also promised to give up the cruel and savage custom of taking heads. The Pelew islanders are a particularly

interesting people. In each village there are large "club-houses," to which the younger men resort. A few women from neighbouring villages also frequent them. It is not considered *comme il faut* for a woman to enter one in her own village. If she did she would become an outcast; going into one a mile or two off, however, in no way affects her position. The buildings are of wood, and the gable ends are adorned with carvings and frescoes. There is also in the Pelew Islands, a curious kind of money. It is really bits of antique glass vessels and jasper beads, which the people believe came down from the gods, but which in fact came out of the ships of early navigators. The scenery of the islands is picturesque and varied. There are grassy downs, wooded hills, and precipitous coral islets crowned with verdure.

In the Polynesian archipelagoes of Samoa and Tonga we find a superior race and, especially in the latter, a comparatively advanced civilisation. The people of the two are akin. The Samoans are of a softer type than the Tongans, who live in a cooler climate. The beauty of the Samoan women has often been remarked, and it would be difficult to exaggerate it. The Tongans are of greater stature, and the women are rather handsome than pretty. The scenery of the Samoan Islands is only surpassed by that of New Britain and Eastern New Guinea. Except in the Vavau group, the Tongan scenery is at best rather poor, as the islands are, in general, low. Samoa is always hot, whilst the winter climate of Tonga-tàbu is delicious. Both archipelagoes are visited by hurricanes, but they are apparently less violent than those of the West Indies and come rarely. All the Samoans are Christians, most of them being under the missionaries of the London Society. There are also Wesleyans and Roman Catholics. In Apia there is a large stone Catholic church and some excellent schools for white, half-caste, and native children, kept by French nuns, of whose work no praise can be too high.

Of late years an attempt has been made to organise a settled government in Samoa; and Great Britain, Germany, and the United States have recognised, and have entered into treaty relations with the chief, Malietoa, who has been made king. The head of a rival family, the Tupua, is vice-king. There is a parliament of nobles and elected representatives who sit in a single assembly. The country was for a long time the scene of tribal wars, and the new government was established to ensure peace. It has, to a great extent, proved a failure, as it has no power and no one respects it. On the whole the country has been peaceful since its establishment, solely because the people are afraid that the outbreak of hostilities would lead to interference on the part of foreign men-of-war. Upolo, on which the town of Apia is, has some large plantations owned by Germans. The Germans have nearly nine-tenths of the trade in their hands, but the British share is increasing. Apia is an orderly settlement of white men, with a municipal government secured to it by treaty. The town and district are exempt from

Samoan jurisdiction, and have an extra-territorial status, something like that of a foreign "concession," at a treaty-port in China or Japan.

Tonga is trying a constitutional experiment on its own account. Mr. Baker, an ex-Wesleyan missionary, has drawn up a constitution to which the venerable king George, who was over ninety years old at the time of my visit, but was as vigorous as most men of sixty, has given his approval. There is a cabinet of which the ex-missionary is the head, a parliament, and a constitutional sovereign. There is also a regular judicial establishment. Great Britain has entered into treaty relations with Tonga, and has even accorded a limited jurisdiction over British subjects to Tongan courts. Englishmen in the South Seas are fond of laughing at the Tongan polity. But it is to the credit of the new State that its public expenditure is small, that it has been for years perfectly orderly, and that there are in the group probably five times as many miles of carriage road as there are in our colony of Fiji. There are many Tongans still living who saw the first horse brought to their own particular island, and thought that it was a large kind of pig. There are hundreds of horses in the archipelago now, and most Tongans are fearless horsemen. They are also capital cricketers, which they owe to the good sense of that very able man, the Rev. Mr. Moulton, who is, or was till lately, at the head of the Wesleyan Mission. Mr. Moulton has founded an admirable college. The scholars receive an education equal to that given in the colonies. I was present at one of the public examinations, and amongst other surprises heard the first canto of the 'Paradise Lost' recited in the native tongue. Most of the Tongans are Wesleyans, but there is also a Roman Catholic mission in the country, and a moderate number of the natives belong to that church. Till lately the trade was almost exclusively carried on by Germans, but our countrymen are getting control of great part of it.

All Pacific Islanders, even many of the Melanesian cannibals, are distinguished by a remarkable refinement of external manners. The Polynesians excel all others; and, probably, no people in the world surpass the Tongans and Samoans in grace and dignity of deportment. The latter races are highly ceremonious, and great observers of etiquette. In Tonga at a *kava* party, where an infusion of the root of the *Piper methysticum* is drunk, the order of precedence is as strictly observed as it would be at a European State banquet. In Samoa the *kava* root is chewed by young ladies before being placed in the bowl. In Tonga it is invariably pounded on a lap-stone. Connoisseurs assert that the beverage is never so good as when the root has been chewed. I never quite got over my repugnance to that method of preparing it, and only drank of it sparingly and to avoid giving offence when out of Tonga. Even in Tonga I felt little inclination to indulge in it freely, possibly because I retain my youthful dislike to rhubarb and magnesia, the flavour of which that of *kava* closely resembles.

My first visit to New Guinea was in the latter part of 1884, as the ship I commanded was in Commodore, now Admiral Erskine's squadron, when that officer proclaimed the British Protectorate. The complete success with which the Commodore carried out this delicate operation, was shown in the uninterrupted friendly relations existing between the white men and the natives in all parts visited. It is no mean testimony to the excellence of the Commodore's arrangements, and the perfection of the discipline he maintained, that though hundreds of sailors were in daily contact with natives, to many of whom white men were almost unknown, not a single unpleasantness occurred. To this satisfactory result the influence of the remarkably able and zealous missionaries, the Rev. Messrs. Lawes and Chalmers, greatly contributed. The good work that these two admirable men have done is simply astonishing in amount and in beneficial effect.

To one who has cruised much amongst the small islands of the Pacific, and who has grown familiar with the monotonous landscapes of Australia, the scenery of New Guinea appears especially grand and imposing. It differs greatly in character. Near Port Moresby the headlands are sparsely wooded, and in the dry season have an almost arid look. As South Cape is approached the vegetation becomes more luxuriant; and near China Straits are found all the varied tints of foliage and herbage which delight the eye in New Britain. As far as has been ascertained the climate is not favourable to Europeans.

The natives of the coast evidently belong to two distinct races. From a point rather to the westward of Port Moresby right on to Aroma, the people are light-coloured, of tall and graceful figure, grave in manner, taciturn, and abhoring cannibalism. The men's dress is simply a strip of bark twisted into a string. The wearers of this express great contempt for neighbouring tribes who go perfectly naked. The other race is black, of shorter and sturdier figure, nimble, cheerful, loquacious, and cannibal. The men wear a curious and decent costume of leaf. The women of both races wear the *titi* petticoat of grass, which is very like a ballet-dancer's skirt. At Port Moresby the houses are built half in the water. At Tupu-selei, Kailè, and Kappa-kappa, they stand out in the sea at a distance of a couple of hundred yards from the beach. Throughout the parts of New Guinea with which I am acquainted, the inhabitants are ingenious and industrious agriculturists, and carefully fence in their plantations. Their houses are large and well built. They make very fine fishing-nets. The canoes of Port Moresby are of enormous size, and the trees out of which they are dug are procured by barter from tribes living a long way off. The Port Moresby pottery is made in large quantities for export; as is a finer kind at Toulon Island by the dark race. This shows that both races engage in manufacturing industry for the express purpose of trading with the products, a thing of happy augury for their future progress.

I made an excursion from South Cape to the summit of a neighbouring mountain, where our party had to pass the night almost without food or water, and drenched to the skin by a nearly continuous fall of very fine rain. The discomforts of the night were scarcely compensated by the pleasure of hoisting the Union Jack in the morning. Attempts at sleep were constantly frustrated by the necessity of expelling some particularly unpleasant intruders—slugs as thick as your forefinger and six or seven inches long, which persistently endeavoured to get inside one's shirt. Twice I was aroused from a doze by finding them coiled round my ears. We took off our wet clothes before lying down, and our native companions seized the occasion to put them on, with such cheery impudence, that we were obliged to join in their roars of laughter instead of scolding them. One gentleman converted a pair of inexpressibles into a vest with sleeves, so much to the improvement of his personal appearance that I made him a present of them: and he had the honour of being presented to the Commodore in his becoming garb, which he wore throughout our stay.

My second trip to New Guinea included visits to the Louisiades, to Woodlark Island, to Rook and Long Islands, and to the mainland near Cape King William. The Louisiade people are in physique and knowledge of the arts inferior to both races of South-eastern New Guinea. Many of them are quite unfamiliar with white men. But I found, even amongst them, some who had heard of Queen Victoria, a name which is so frequently known and so greatly respected throughout the South-western Pacific, that the stranger is fairly astonished. A native of Joannet Island intimated that he was aware that Queen Victoria was the chief of Cooktown, the little port in Northern Queensland. On Rossel Island I noticed, in the case of some of the men, the curious dentition which the eminent Russian traveller Dr. Miklukho Maclay has called "macrodontism." A continuous tooth extends over the space usually occupied by two or three teeth. The Woodlark islanders are very fierce, and at one time I thought a collision with them inevitable. They make the same curious gesture of salutation as the Basilaki (or Moresby) islanders, pinching first the nose with one hand and then the navel with the other, finishing up with a low bow.

The natives of the north-east coast of New Guinea whom I met were black, and not superior in physique to the Louisiade people. While in the south of New Guinea the natives are in the stone age, these people have not got beyond the period of shell implements. They could hardly be made to understand the use of a tomahawk, and were frightened by striking a match.

The Rook islanders seemed never to have seen a white man. Smoke coming out of the mouth of an officer with a pipe greatly surprised them. A chief on being brought up to a looking-glass was struck dumb. The exhibition of a cat caused great excitement, which was immensely

increased by showing them a sheep. They are a light-coloured, tall, good-looking race, who express great repugnance to cannibalism. They build good houses and temples, have well laid-out villages, and possess large highly painted canoes ornamented with carvings. They practice circumcision, and an incised figure of an alligator adorns the entrance to their temples. Their reception of my companions and myself was courteous and friendly in the extreme. One of the officers of H.M.S. *Dart* was a good conjuror, and the delight with which the disappearance of a coin through the bottom of a tumbler was hailed by the natives was intense.

A few observations on the condition of the South-western Pacific may not be out of place. I believe that the members of even the most savage tribes desire to be on friendly terms with white men. There are some tribes who, in pursuance of the barbarous custom of taking heads, will make unprovoked attacks on white visitors. But they are comparatively rare exceptions. I fear that most of the so-called "outrages" are to the natives what the retaliatory action of ships of war is to us. We regard the latter as the proper punishment of an offending tribe; and the islanders look upon the killing of a white man—if any white man has done them an injury—as much the same thing. Events have proved that the old practice—for years given up by us, but still followed by some European nations—of the wholesale punishment of the people of an island charged with an "outrage" does nothing to improve relations with the islanders. The plan of punishing only the really guilty has been far more successful, and when that is universally adopted the friendliness of our relations is sure to increase. During all my cruises we invariably contrived to keep on good terms with the natives, even, as at Woodlark Island, where they were at first very suspicious. But I had the immense advantage of cruising, at all events in most waters, where the humane and just actions of my predecessors had brought the names of English captains into high repute with people who, savage as they are, have a keen sense of justice. I doubt if there ever was a time when a determination to act justly and considerately failed to make friends of the Pacific islanders. Forty years ago Captain John Erskine, in command of H.M.S. *Havannah*, proved that this was possible, perhaps easy; and I advise any one likely to have anything to do with the islanders to read the charming narrative of his cruise.

The diminution of population is one of the mysteries of the Pacific. It has perhaps been arrested in Fiji. Time will show if the stoppage is permanent. On the small Wallis Island under the Catholic, and Niué or Savage Island under the Protestant missionaries, the people increase; elsewhere, whether Christian or savage, they diminish. It is common for natives to speak of the greater numbers of their tribes in former days, and there is evidence to support their assertion. Can it be that

the islands of the Pacific have been the seats of a succession of races, all of which have at a certain period in their history declined and disappeared, and that our acquaintance with the present inhabitants only began when the declining stage had been reached? The suggestion is made with timidity, but I confess that I sometimes fancy that something like it may explain the existence of the curious ruins so widely scattered throughout Oceania.

The Pacific islands cannot be mentioned without calling to mind the missionaries who labour amongst them. Their success has been very great; but, great as it is, I think its magnitude has been exaggerated. The Christianity of the Western Polynesians is not much to boast of; and their present state of civilisation is much more owing to frequent intercourse with white men who are not missionaries, than is generally admitted. Without missions they would not have advanced as far as they have done; nor with them would the advance have been what it is had no other white men ever gone among them. The same thing is true of Fiji. Some of the "pioneer" missionaries are men of whom every country might feel proud. The influence for good of such men as Mr. Moulton of Tonga, or Mr. Robertson of Erromanga, is enormous; but they are men of enlarged views and of even statesmanlike capacity, who would be powerful over their fellows anywhere. The same may be said of Messrs. Lawes and Chalmers in New Guinea, and will explain to a great extent their astonishing success. Mr. Chalmers is a born leader of men, and his ascendancy over those with whom he is brought in contact is due to a never-failing tact and a nobility of mind which have been rarely equalled.

It is hazardous to forecast the future, but it does not seem that the Pacific islands are likely, for generations yet to come, to be of use to mankind at large. Fertile as they may be, they can only be made productive with labour, of which no man can say where it is to be obtained. The Spanish colonisation of the Caribbean Islands cannot be repeated; extermination of the natives and the substitution of African slaves are, fortunately, impossible.* Though we have made what I venture to think an unwise and uncalled-for irruption into New Guinea, we are not likely to do as at least one foreign nation has done. One great State has begun its colonial history by annexing islands which cannot for many years, if ever, do more than provide moderate incomes for two or three trading houses, and the trade of which will infallibly pass into English hands if anything like fair competition is permitted. This is not a profitable return for a material increase of public expenditure, for an injudiciously wide distribution of a not too considerable naval force,

* Even should Chinese immigration repeople the island, which is possible and not very unlikely, many years must elapse before the products of Oceania will be at the disposal of the outside world in considerable quantities. The day is past when even Chinese would cultivate the island as the virtual slaves of the white planters.

and for the risk of entanglements full of menace to the tranquillity of foreign relations.

As we have chosen to go to New Guinea uninvited, we are bound in honour to do all the good we can to the races who have not resented our intrusion, but have received us as friends. If we do not take the proper steps, we shall soon find that we have a wolf by the ears. We have a noble chance, we are not likely to have another, of showing that Englishmen can rule barbarians without exterminating them or dispossessing them of their lands. I believe it possible to make New Guinea happy, prosperous, and civilised; I also believe that it may, and in no long time, be made self-supporting. But the right method must be adopted, and a system to suit politicians here and in Australia may be utterly unsuited to the conditions of the country. If the latter be adopted the natives will deserve all the pity we can give them.

Previous to the reading of the above paper,

The CHAIRMAN (Lord Aberdare) announced that Captain Bridge, the author, was prevented being present, through having been just appointed to the command of the *Colossus*, one of the largest vessels of war in Her Majesty's service. Captain Bridge was for several years Deputy Commissioner to enforce the laws as to the employment of labour in the Western Pacific. Most of those present had observed from time to time the accounts that appeared in the papers of outrages committed on the natives of many of the islands, especially the Solomon Islands, and the New Hebrides; of late years the British Government had most laudably endeavoured to enforce those laws and to prevent the inhabitants being kidnapped and taken to the Australian Colonies, especially to Queensland, which had been the principal offender in this respect. It had been the duty of the Deputy Commissioner to punish offenders against those laws. The veteran traveller, Baron Hubner, had published a book describing his visits to the British possessions. He accompanied Captain Bridge on part of his cruise in 1884, and had given a most lively description of all that he saw. He had also given what to Englishmen must be a very pleasant account of the state of things that he found on board the ship. We often found fault with our army although that army was constantly doing most heroic duties, and we were often told that our navy was nothing like the navy of the olden times, but with regard to the *Espiègle* commanded by Captain Bridge, Baron Hubner after speaking of the officers as being very intelligent and pleasant companions, said, "Most of the sailors seem to me very young, but strong, well set up, and cheerful. I am struck by the tone of good breeding that prevails on board. There is not a coarse word nor an oath. Everything goes like clockwork. What a contrast to what I have seen forty years ago on board many English and other men-of-war!" The photographs exhibited on the table were taken by the sailors themselves from instructions they received from a photographer in Australia. This would be acknowledged by all to be a wonderful advance over the Jack Tar of old. In the absence of Captain Bridge the paper would be read by Mr. Gervase Mathew who was one of the officers on board the *Espiègle*.

After the paper,

Mr. A. P. MAUDSLAY, who was called upon by the Chairman, said his experience had principally lain among the natives in Fiji, Samoa, and the Friendly Islands. Captain Bridge deserved great thanks for the information he had given with regard to the islands in the Western Pacific, because it was most difficult to obtain such

information. When he (Mr. Maudslay) was out there he used to question all the Government Agents who sailed in the vessels employed in the labour trade, but they were not always careful observers, and such as were good observers were not always able to describe what they had seen. One man to whom he spoke seemed to be very intelligent and greatly impressed with the beauty of the Solomon Islands, but when he attempted to describe the country his language altogether failed him, and he simply said, "I never saw such scenery. There is first-rate bathing, most beautiful blue water, and it is a most eligible site for villa residences." It turned out that his previous occupation had been that of a house-agent in Melbourne. The question of the migrations from island to island was a very interesting one. Captain Bridge had alluded to a light-coloured people who lived on Rook Island, and there were light-coloured people on many of the islands of the western groups, but they must certainly have migrated from the east. There had been a great distribution of races from one or more centres, but he wanted very much to know where the centres were. It was most important and interesting to trace these migrations. On one occasion he went to church in the King Country in New Zealand; it was on Thursday, but it was explained to him by the Maoris that the king had found four Sundays in a month too many, so that it had been agreed that there should only be a Sunday every ten days. The service lasted about a quarter of an hour, and at the end of it the chief turned round and said, "I suppose it is all gibberish to you, but those were the songs that our forefathers sang when they came from Hawaii." This Maori tradition of the migration from Hawaii is particularly clear, but Hawaii is a name found in many forms all over the Pacific, such as Savaii in Samoa, Haapaii in Tonga, and the Hawaki of New Zealand, and it is difficult to identify the true Hawaii of tradition.

He was at one time engaged in assisting in the establishment of the authority of a supreme chief or king in Samoa, and he was much struck by the stress laid by the natives on the legitimacy of the claim of Malietoa to this chieftainship on the grounds of descent. It appeared that the first Malietoa had risen to power as a leader of a revolt against the rule of the Tongans who had invaded and conquered the Samoa Islands. What was the date of the Tongan conquest it is not very easy to ascertain, but the expulsion of the Tongans took place probably not more than 250 years ago, as only between twenty and twenty-five Malietoas had since then succeeded to the name. In the islands of Upolu and Savaii, the Samoan natives inhabit only the sea coast, and the Tongans effected the conquest by making a road along the central mountain ridge and thence making descents on the villages on either side of the island. Traces of these roads called Ala i Tonga (Tongan roads) can still be seen.

A number of Samoan chiefs and elders once met him to discuss some matter of business in the house of Dr. Turner the missionary at Apia. Just before the meeting, Dr. Turner (who had recently returned from a missionary voyage to the Gilbert and Ellice group), had been showing him a staff which had been given him by some natives in one of the Ellice Islands who held to the tradition that their forefathers had come from Faleuli in* Samoa, and had brought this staff with them. The staff, which was old and worm-eaten, held together with a lashing of sinnet, did not appear to differ in any way from the tall staff which a Samoan orator always holds in his hand and leans on when making a speech. After the business of the meeting was over, this staff was shown to the native chiefs,

* Mr. Maudslay, who was speaking from memory, said that he was not certain of the name of the district.

without however any remark being made as to its history, and it was passed from hand to hand. The first remark made was, that the sinnet with which it was bound was foreign, as the strands were not plaited in the Samoan manner. Then, when it passed to the hands of one of the "talking chiefs," after examining it carefully, he stood up as if about to commence a speech, placing his hands on the top of the staff and then attempting to rest his chin on his hands. He then sat down with the remark that the staff must have come from Faleuli. When asked why, he replied, "Did not you see that when my hands were on the top of it I could not pass it under my chin, and no orator would have the bad manners to talk over a staff that he could not rest against his chest; but the men of Faleuli are so tall that they could use a staff of that height without offence." Subsequently, inquiries at Faleuli resulted in showing that the story was well known that several generations before, a number of large canoes had put to sea on some expedition from which they never returned, and that they were never heard of again.

He would like to hear more about the ruins in the Caroline Islands which Captain Bridge had alluded to. It was important that they should be carefully described and surveyed. The traditions and customs of the Samoans had been preserved to us in Dr. Turner's admirable book, and those of Tonga in that best of all books on native affairs—Mariner's 'Tonga Islands,' which had apparently become Professor Huxley's favorite theological reading; but it is to the efforts of naval officers and deputy commissioners that we must look to obtaining some knowledge of the natives of the Western Pacific, before they become influenced by foreign ideas and customs.

The CHAIRMAN called upon the meeting to join him in a hearty vote of thanks to Captain Bridge for his interesting paper, which was brimful of information, graphically conveyed by a man of unusual powers of observation. It was most satisfactory to Englishmen to know that their maritime supremacy was maintained by men of such intelligence and humanity. If all officers were like Captain Bridge many of the difficult problems as to the proper relations between semi-barbarous and civilised people would be satisfactorily solved. He was pleased to learn from the paper, as he had previously done from Mr. Romilly's account of the same regions, that the practice of wholesale vengeance for an act of cruelty had been abandoned by the English, though he was sorry to say it had not been by some other nations as civilised as ourselves. Mr. Romilly had described the great astonishment of the natives at finding that when an Englishman had been maltreated or murdered, the vessel that arrived subsequently did not take indiscriminate vengeance on the people, but only tried to discover the real offenders and punish them. The effect of that action had been most advantageous in every way, teaching the natives that the real offence lay in the perpetrators of the act and not in the tribe of which they were members, and enlisting their feelings on the side of justice, instead of leading them to place every possible obstacle in the way of inquiry. During the three years and a half of his cruise in those regions no act of hostility took place between Captain Bridge and even the most barbarous tribes. He was happy to hear that acts of brigandage on the part of the colonists had greatly diminished, and believed that in a few years there would be an end to a practice which had brought disgrace upon our brethren in the Australian Colonies.

Exploration of the Ruins and Site of Copan, Central America.

By A. P. Maudslay.

(Read at the Evening Meeting, June 28th, 1886.)

Maps* and Plans, p. 608.

Since I had last the honour of addressing this Society, I have made two expeditions to Central America, for the purpose of examining more thoroughly the ruins at Quirigua and Copan.

I arrived at Quirigua in February 1883, built a temporary house in the midst of the ruins, and remained camped there with my companions for more than three months.

The ruins, which are completely hidden in a thick tropical forest, stand about three-quarters of a mile from the left bank of the river Montagua, and about five miles from the miserable little village of Quirigua, from which they take their name. They consist of numerous square or oblong mounds and terraces, varying from six to forty feet in height, some standing by themselves, others clustered in irregular groups. Most of these mounds were faced with worked stone, and were ascended by flights of stone steps.

The interest centres in the thirteen large carved monoliths which are arranged irregularly round what were probably the most important plazas of the *pueblo*.† Six of these monuments are tall stones measuring three to five feet square, and standing 14 to 20 feet out of the ground; the other five are oblong or rounded blocks of stone shaped so as to represent huge turtles or armadilloes or some such animals. All these monuments are covered with elaborate carving; usually on both back and front of the tall monoliths there is carved a huge human figure standing full-face, and in a stiff and conventional attitude. The sides of the monuments are covered with tables of hieroglyphs, most of them in fairly good preservation. In addition to these tables of hieroglyphs there are series of squares or cartouches of what appears to be actual picture-writing, each division measuring about 18 inches square, and containing usually two or three grotesque figures of men and animals. The design of these picture-writings shows considerable variety and freedom of treatment as compared with that of the large-sized human figures, in the execution of which the artist seems to have been bound by conventional rules.

The largest of the stone animals is perhaps the most remarkable of all the monuments; its measurement is roughly a cube of eight feet,

* For general map see 'Proceedings,' 1883, p. 248.

† I use the Spanish word "pueblo" in preference to the English word "city," which has generally been used in describing Central American ruins, and is somewhat misleading.

it must weigh nearly twenty tons, and it rests on three large slabs of stone. It is shaped like a turtle, and is covered with the most elaborate and curious ornament, and with tables of hieroglyphics and cartouches of picture-writing. The greater part of the ornament throughout these carvings is formed from the grotesque representations of the human face or the faces of animals, the features frequently so greatly exaggerated that it is most difficult to recognise them, but a careful examination enables one almost invariably to trace back to this facial origin what, at first sight, appears to be merely conventional scrollwork. Forms derived from leaves or flowers are altogether absent; occasional use is made of a plaited ribbon, and a very free use of plumes of feathers, which are often most gracefully arranged and beautifully carved. The fifteen monuments are divided into two groups; in one the figures are all those of men, in the other of women. It might be rash to argue from this, that women had attained a high place in the social arrangement of the people who raised these monuments; but there is one other feature that certainly may be admitted as showing an advanced and peaceful condition of existence, and that is the entire absence of any representation of weapons of war.

The work of examining and copying the carvings at Quirigua was one of no small difficulty; it was necessary, after clearing away the thick undergrowth, to fell the forest trees, and after an interval of about ten days, to run fire through the clearing.

The earth round the monuments had to be cleared away usually to the depth of two or three feet, as, probably owing to floods from the river, the level of the ground had considerably altered since they were originally placed in position; a scaffold had then to be built round each monument and the carving subjected to a careful and thorough cleaning. This cleaning proved to be the most tedious part of the work, as the stone was always covered with thick and adhesive growths of moss and lichen. Two of the animal-shaped monoliths were almost completely buried under huge forest trees, which had grown exactly on the top of them, and it was only by a chance notice of some carved stone appearing between the roots that I became aware of their existence. I had one of these trees felled, but found the stones so much crushed and destroyed by the pressure of the roots that nothing remained worth moulding.

All provisions and all materials for the work, including such things as photographic dry-plates, moulding-paper, lime, oil, and nearly four tons of plaster, had to be carried in small quantities, sometimes on mules, but more usually on men's backs, from the port of Ysabal, about 24 miles distant, over a range of hills, along a track which proved almost impassable in bad weather.

We commenced work early in February, which is usually the beginning of the dry season, but unluckily during that whole month the rains continued and work was carried on under the greatest diffi-

culties; excavations were filled with water as soon as made, and no moulding could be done unless a water-tight roof was first built over the monument which was to be worked at. At one time the floods covered all but a few feet round the knoll on which we had built our palm-leaf shanty, everything in camp turned green with mould and mildew, and snakes and scorpions were very troublesome, and mosquitos were innumerable. Worse than all, the sick list increased, until at last twelve Indians were ill with fever on the same day, and the sound ones all ran away home. After a long and tedious search I was able to engage other labourers, and from that time matters began to mend; the Indian labourers suffering from fever recovered, and the weather became so hot and dry, that we were able to work on steadily until the first week in May. By that time I had secured a complete set of photographs of each of the monuments; Mr. Guintini had finished a plaster mould of the great turtle—a mould of over six hundred pieces—and he had also moulded the most interesting portions of two other monuments. In addition to this, with the aid of my half-caste companions I had taken a mould in paper of one entire monument, and of every table of hieroglyphics and picture-writing which could be found, and Mr. Blockley had made a careful survey of the site of the ruins. The work of packing and transporting the moulds to the port was one of even greater difficulty than bringing the material, for there were over a thousand pieces of plaster moulding of all shapes and sizes with delicate points and edges which had to be protected from the slightest jar, and large paper moulds, some of which measured nearly five feet square. The last loads were not over the mountains when the rains commenced again with tremendous thunderstorms, and the mountain tracks were again an alternation of mud-holes and watercourses. A few of the paper moulds were damaged by damp on the passage home, but, on the whole, the result of the expedition has been very satisfactory, and there can now be seen in the Archæological Museum at Cambridge a cast of the largest of the upright monoliths, a beautiful cast of the large turtle, and a complete set of all the tablets of hieroglyphics.

In the autumn of 1884, I again started for America. The object of my journey was to explore more thoroughly the ruins at Copan, where I arrived on the 10th January.

Through the courtesy of the Foreign Office, the Government of Honduras had been informed of my proposed expedition, and General Bogran, the President of the Republic, most kindly sent Don Carlos Madrid, a gentleman much interested in archæology, to meet me at Copan, and ensure me every facility for carrying out my work.

I at once set men to work clearing the bush and cleaning the monuments, and then at the end of a week I had to start off myself for the Port of Ysabal where I expected to meet Mr. Guintini, who was to have come direct from England with my heavy baggage, stores, plaster,

instruments, &c. Unfortunately the ship in which he sailed broke her shaft, and his arrival was delayed for a month.

It was no use returning to Copan without the material I needed for my work, and I could trust the half-caste overseers to carry on the clearing of the bush and cleaning of the monuments. I therefore determined to occupy my time with a trip to Chaal, an Indian village on the Sarstoon. I started from Ysabal with Carlos Lopes, a half-caste, and three Indians, and crossing the Golfo Dulce in the night when the wind falls light, arrived by daylight at Morcielagos, where there are one or two huts, and then, following an Indian trail, six days' walking brought us to Chaal. The track lies through forest all the way, the country is altogether uninhabited, and we did not appear to pass over a quarter of a mile of level ground during the whole journey. It rained during a great part of the time, the ground was slippery and often ankle deep in mud.

Chaal is a large village which has sprung up during the last two years, and is inhabited by Indians who have run away from Cajabon and St. Pedro Cacha and settled themselves in this obscure spot in hopes of escaping the heavy taxation of the Guatemala Government; however, the Government has proved too sharp for them, for I found a half-caste Government Agent already installed there collecting taxes. The spot is interesting as the site of the old village of Chaal, which up to the end of the seventeenth century was the chief village of the Choles, a harmless and uncivilised tribe, whose heathen condition was a great grief to the Dominican monks of Coban, who made many missionary journeys amongst them which are chronicled in Remesal's 'History of Chiapa,' and Villagutierez's 'History of the Conquest of Itza.' As soon as the padres turned their backs the hastily baptised converts took to the forest and reverted to their old ways, and the work of conversion had to be done all over again; until at last, in the year 1668, the Government sent troops to the assistance of the priests and the wretched remnant of the tribe were hunted out of their homes and carried off to be settled near Rabinal, to be made into good Christians and give their name to the village now marked *Chol* on the maps.

Half-way between Chaal and Cajabon the country becomes more open and one passes through the cultivated corn gardens of the Cajabon Indians.

From Cajabon I rode to Pansos, crossed the Rio Polochic, and visited the ruins (on the Rio Tinaja) of the pueblo which was called Chacujal by Cortez, which I shall have occasion to describe presently.

From thence I travelled by canoe down the Polochic to Ysabal where I met Mr. Guintini and at last started off my mule trains for Copan and arrived there myself on the 26th February.

The name "Copan" is properly that of the district or province, but it is more frequently used to designate the small modern village which has been built amidst the ancient Indian ruins.

This village is situated just within the western boundary of the Republic of Honduras (lat. 14° 50′ 30″ N.), on the right bank of the Copan river, a stream which rises to the north-east of the ruins, and, after flowing for about 30 miles in a westerly direction, turns to the north and joins the Rio Montagua in the neighbourhood of Zacapa. The Montagua then continues its course in an E.N.E. direction to the Gulf of Honduras, passing the group of ruins at Quirigua, which has already been described. It is worth noting that these latter ruins must lie not more than 25 to 30 miles to the north or north-west of those at Copan. At the present time there is no road across the rugged and thickly-wooded hills which lie between them, and the nearest practicable track from Copan to Quirigua takes a considerable sweep to the westward and strikes the Montagua in the neighbourhood of Gualan.

Where the principal ruins are found, the valley formed by the Copan river is a mile to a mile and a half broad. The river enters this valley on the north-east from between hills which open out gradually, and flows about a mile in a south-west direction under the southern line of hills; it then runs for a short distance to the west, and on reaching the principal group of ruins, bends to the south, as shown in the plan (I.), and after running about half a mile in this direction turns again to the west, flowing along the south side of the plain.

The tops of the hills on each side of the valley are covered with somewhat open pine forest, but the lower slopes are clothed with an almost impenetrable undergrowth of scrub. The modern village stands on part of the site of the ancient pueblo, about three-quarters of a mile to the west of the principal group of ruined edifices. It is merely a collection of a dozen miserable shanties inhabited by half-castes. The clearings continually made by these people for their tobacco and maize plantations have kept much of the plain free from large timber trees, and for a distance of about three miles along the valley (wherever the more recent clearings enable one to examine the ground) raised foundations and mounds of stones can be seen, evidence of the considerable population which must have at one time inhabited the plain. Similar remains can also be found in many of the smaller valleys in the neighbourhood. Copan was visited by Col. Juan Galindo in 1834, and by Stephens and Catherwood in 1839, and it is through Stephens's writings and Catherwood's admirable drawings that the ruins are best known.

In attempting to trace back the history of the pueblo Stephens follows the account given by Juarros in his history of Guatemala, and Juarros in turn took his description from an unpublished manuscript of Fuentes y Gusman, which Bancroft says is still preserved in Guatemala. Fuentes's account of the ruins is so fanciful and extravagant that there can be no doubt that he never visited them himself, but wrote merely from hearsay.

No record has been left by the Spaniards who first penetrated into

this part of the country of the existence of any large town or civilised population where the ruins are now found, and the attempt made to connect the site of the ruins with that of an Indian village conquered by Hernando de Chaves in 1530, has completely broken down, although the fact that Chaves made an expedition into this part of the country and subdued the Indians in the neighbourhood is not disputed.

We have to turn then for the only trustworthy information given by the Spaniards about these ruins, to the letter written by the Licenciado Diego de Palacio, an officer of the Audiencia of Guatemala, to King Phillip II. of Spain, dated, Guatemala, 8th March, 1576. The contents of this letter have been made use of by Herrera and other historians, but they have omitted to take notice of that part dealing with the ruins of Copan. However, the great importance of this description was justly appreciated by Squier, who, in 1860, published the whole letter * in Spanish as well as in an English translation. The following is Palacio's account of the ruins:—

"Near here, on the road to the city of San Pedro, in the first town within the province of Honduras, called Copan, are certain ruins and vestiges of a great population and of superb edifices, of such skill and splendour that it appears that they could never have been built by the natives of that province. They are found on the banks of a beautiful river in an extensive and well-chosen plain, temperate in climate, fertile, and abounding in fish and game. Amongst the ruins are mounds which appear to have been made by the hand of man,† as well as many other remarkable things.

"Before arriving at them we find the remains of thick walls, and a great eagle in stone, having on its breast a tablet a yard square, and on it certain characters which are not understood. On arriving at the ruins we find another stone in the form of a giant, which the elders amongst the Indians ‡ aver was the guardian of the sanctuary. Entering into it we find a cross of stone, three palms in height, with one of the arms broken off. Further on we come to ruins, and, among them, stones sculptured with much skill; also a great statue, more than four yards in height, which resembles a bishop in his pontifical robes with a well wrought mitre (on his head) and rings on his fingers.

* 'Collection of Rare and Original Documents and Relations concerning the Discovery and Conquest of America, chiefly from the Spanish Archives.' New York, 1850. A copy of this portion of the letter is also to be seen amongst the Muñoz collection of Spanish MS. in the British Museum (17,571).

† "Hai montes que parecen haber sido fechos a mano" Squier here translates "are trees which appear to have been planted by hand." "Monte" all over Spanish America is synonymous with "bush" as that term is used in Australia; but it here clearly is used in its original sense of hill or mound.

‡ "Dicen los Indios antiguos" would appear to mean here, the elders amongst Indians, and not the Indians of a time long past, although the latter is certainly the more literal translation.

"Near this is a well-built plaza or square with steps, such as writers tell us are in the Coliseum at Rome. In some places there are eighty steps, in part at least, of fine stone, finished and laid with much skill.

"In this square are six great statues, three representing men, covered with mosaic work, and with garters round their legs, their weapons covered with ornaments; and the other two of women with long robes and head-dress in the Roman style. The remaining statue is of a bishop, who appears to hold in his hand a box or small coffer. They seem to have been idols, for in front of each of them is a large stone with a small basin and a channel cut in it, where they executed the victim and blood flowed off. We found also small altars used for burning incense. In the centre of the square is a large basin of stone which appears to have been used for baptism, and in which, also, sacrifices may have been made in common. After passing this square we ascend by a great number of steps to a high place which appears to have been devoted to *mitotes* and other ceremonies; it seems to have been constructed with the greatest care, for through the whole of it there can still be found stone excellently worked. On one side of this structure is a tower or terrace, very high, and overhanging the river which flows at its base.

"Here a large piece of the wall has fallen, exposing the entrance of two caves or passages extending under the structure, very long and narrow, and well built. I was not able to discover for what they served or why they were constructed. There is a grand stairway descending by a great number of steps to the river. Besides these things there are many others which prove that here was formerly the seat of a great power and a great population, civilised, and considerably advanced in the arts, as is shown in the various figures and building.

"I endeavoured with all possible care to ascertain from the Indians, through the traditions derived from the ancients,* what people lived here, or what they knew or had heard from their ancestors concerning them. But they had no books relating to their antiquities, nor do I believe that in all this district there is more than one, which I possess. They say that in ancient times there came from Yucatan a great lord who built these edifices, but that at the end of some years he returned to his native country, leaving them entirely deserted.

"And this is what appears most likely, for tradition says the people of Yucatan in time past conquered the provinces of Uyajal,† Lacandon, Verapaz, Chiquimula, and Copan, and it is certain that the Apay language which is spoken here is current and understood in Yucatan and the aforesaid provinces. It appears also that the design of these edifices is like that of those which the Spaniards first discovered in Yucatan and Tobasco, where there were figures of bishops and armed men and crosses.

* "Saber, por la memoria derivada de los antiguos, que gente vivio alli, e que saben e oyeron de sus antepasados."

† Uyajal, probably *Tyasal*, the modern Flores, an island in the Lake of Peten.

And as such things are found nowhere except in the aforesaid places, it may well be believed that the builders of all were of the same nation."

This description is such a one as might have been written by any intelligent visitor within even the last few years. The edifices were evidently in a state of complete ruin, and no mention is made of any roofed buildings, or in fact, of any buildings which could have been used as habitations. It is clear from other parts of this letter that Palacio was a very diligent and careful enquirer into all matters connected with the history and customs of the Indians, yet the very vague story which he was able to gather from the natives in the neighbourhood is no more than they would probably have invented to account for the existence of the ruins, even had all connected tradition died out.

The chief interest at Copan has always attached to the numerous sculptured monoliths which stand amongst the ruins, but as these have already been described and figured I do not propose here further to allude to them. The ruins themselves have usually been described as remains of pyramidal structures and terraces, to which no especial meaning could be attached. Remains of city walls are almost always spoken of, and various theories have been put forward to account for the great wall facing the river, and the descriptions generally agree with that of Stephens in stating that "there are no remains of palaces or private buildings."

The result of my examination of these ruins has been to show that many of these statements have been made in error.

As the attached plan of the principal structures is intended to show (II.), these so-called pyramids are, almost in every case, the raised foundations which supported roofed buildings—probably temples—which were approached by steep flights of steps. The remains of four of these buildings I have cleared from the masses of fallen masonry which covered them, and they will presently be more fully described.

The long heaps of stones which were taken to be the ruins of city walls, are, in fact, the remains of single chambered, stone-roofed houses, probably dwelling houses, which were raised on foundations not more than a few feet high. Numbers of such houses are to be found in all parts of the valley. Finally, the great river wall, which is at one point 107 feet high, has come into existence, and attained its present cliff-like appearance from the river having changed its course and eaten into the raised terraces and lofty foundations on the east side of the ruins, and apparently the damage by the river had been already, to a great extent, effected by the time of Palacio's visit. A glance at the plan (II.) will at once make it clear that in all probability the temples and other buildings were originally approached by slopes and stairways on the east as they are on the other sides.

The small village of Cachapa, situated about seven miles up the river valley to the north-east, evidently stands on the site of old buildings,

and several pieces of stone with remains of hieroglyphic writing on them are still to be seen lying amongst the rubbish on the plaza. Down stream, about 2½ miles west of the village of Copan, at the top of a high hill commanding a magnificent view of the valley, there are also to be seen remains of some stone foundations, and, lying amongst them, a fallen and broken monolith (originally standing about 12 feet high above ground), carved all over with a hieroglyphic inscription, now much worn and very indistinct.

The attached sketch map (I.) shows a high pyramidal foundation, close to the houses of the modern village of Copan, at the top of which was found a flat slab of stone, about two feet square, with a hieroglyphic inscription on its sides. I was not able to ascertain if any stone building had ever stood on this foundation, but am inclined to think not. There is a broken and defaced monolith lying in the scrub about 50 yards to the west of the village, and two red marks on the map show where two square altars (?) stand on the village green.

The plain, between the stream that runs on the east side of the village and the principal ruined edifices, is covered with the remains of groups of houses generally arranged round a courtyard. Only a few of the higher foundations which may have supported temples are marked on the map. There is one broken monolith lying in the scrub to the north of the track to Cachapa.

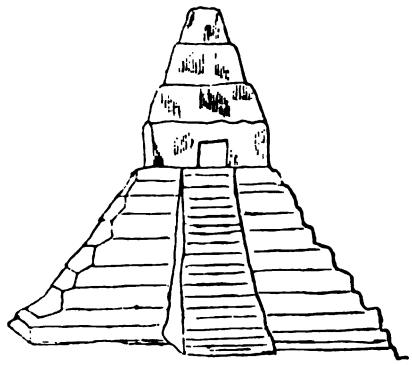
Before describing more fully the ruins shown in the large plan, it is as well to say that at the commencement of the survey the whole area was covered with a dense scrub which it was necessary to clear away and burn. As, however, the level plazas had been used as planting ground, they were free frem large timber trees. The careless burning of felled timber and shrubs by the natives when forming their plantations, has proved most disastrous to the sculptures in the plazas; almost all have been seriously damaged by fire and some entirely destroyed.

On the slopes and raised terraces, which could not be planted with maize, there is still a thick growth of forest trees, which, except when absolutely necessary, I did not remove.

The lines on the plan are more regular than those presented to the eye at the ruins, as they have been laid down without showing the masses of stones and débris which have fallen from above; but great care has been taken not to do this by guesswork, but, as far as possible, by removing the fallen stones at intervals, to ascertain the original limits of the slopes and stairways. The whole mass of terraces and pyramidal foundations is built up of a rubble of rough blocks of stone and mud, bound together, in the course of erection, with internal upright walls of faced stone and horizontal layers of cement. The outer surfaces were always covered with a casing of well-worked stone, often elaborately sculptured.

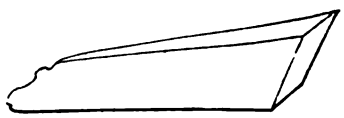
The sections give some idea of the mass of masonry which has been

raised from the plain. On the pyramidal foundations the worked stone casing is usually arranged in great steps, a single step measuring in some instances as much as eight feet in breadth and height. The heavy rains and the growth of the roots of trees and shrubs has reduced these structures to rough-looking mounds of tumbled blocks of stone and rubbish, square or oblong at the base, more or less rounded at the corners, and rising almost to a point or flat ridge at the top. Where this step-like formation is still well preserved it is marked on the plan by parallel lines. Some of the buildings which stood on these high foundations were two stories high, and all, probably, had lofty superstructures (as at Tikal and the ruins on the banks of the Rio Usumacinta). The destruction of these superstructures accounts for the present shape of the mounds, the falling masonry having knocked off the salient angles of the large steps, and filled up the receding angles with broken fragments, and the whole mass has been subsequently bound together by the roots of trees. So complete is the ruin of the temples and houses, that in no single instance could any portion of the walls of these buildings be seen without digging through the fallen masonry and rubbish to some considerable depth.



BUILDING AT TIKAL.

The system of roofing here used (as in all ancient American buildings) was the horizontal arch. I first felt something like certainty that stone roofed houses had been raised on these foundations on finding amongst the débris at the bottom of the slopes faced stones cut diagonally at one end, which it seemed certain must have been used in the construction of roofs. I also noticed that many of the mounds had slight depressions on the top ridge, either one in the centre or two or more at regular intervals. These depressions, I thought, might mark the position of the doorways, and this I found to be the case, and it proved to be a most useful guide when I commenced excavations.



Round three sides of the great plaza, where the greater number of the stone monuments are to be found, the steps rising to the terraces are in a fairly good state of preservation. The large square mound on the first terrace to the west (No. 1) has a distinct flight of steps, shown in the

plan. The top is flat and almost square, and there is no evidence that any stone building had ever been raised on it. Some previous visitor had dug into the foundation, but there was nothing of interest to be seen. A broken monolith lies in front of this mound. The slopes and mound which rise still higher to the west of this are too much destroyed to be of any interest.

On the terrace to the north of the great plaza is another square mound (No. 2) which, as in the case of the last described, shows no trace of any stone building having been raised on it. Immediately to the west of this mound are the remains of a long single-chambered house. The group of buildings on the terrace to the east of the plaza show unmistakable signs of having been houses. The high foundation (No. 3) at the east end of this group would probably repay excavation; the stairway on the south side of it can be clearly made out, and there are some roofing-stones lying at the foot of the slopes.

The mound (No. 4), standing by itself, in the centre of the plaza, is one of considerable interest; the outer casing of masonry is much broken up and has almost entirely disappeared, but the steps by which it was ascended are still traceable on the east side. The top rises almost to a point, and there is no sign of any building ever having stood on it. I commenced an excavation of this mound from the top, opening it towards the south side. The upper part was composed of rough unworked blocks of stone and mud, with occasional layers of cement and sand; the lower two-thirds, of stone and mud only; below the level of the plain there were no stones, but about 12 feet of hard rammed earth. In the centre of the mound, about six feet from the top, an earthen pot was found containing a bead-shaped piece of greenstone, pierced, diameter $2\frac{3}{4}$ inches; the remains of a necklace of six jade beads, four pearls, and some small rough figures cut out of pearl oyster-shell; the jade whorl of a spindle; some other irregular pieces of roughly carved pearl-shell. At the bottom of the pot was some red powder, and several ounces of quicksilver. Eighteen inches above this pot some traces of bone were found mixed with sand.

The excavation was then continued down to the level of the ground, where more traces of bones were found mixed with red powder and sand, and one large pierced bead-shaped stone, diameter three inches. Continuing the excavation to the depth of eight to nine feet below the level of the plain, a skeleton of a jaguar was found lying under a layer of charcoal. I was able to preserve some of the teeth and some part of the jaw as well as a few small pieces of the other bones by dropping them into glue. The teeth and part of the skeleton had been painted red. About 100 yards almost directly to the south of this mound I shortly afterwards opened another very much smaller and much more ruined mound, and, under a thick layer of cement at the level of the ground, found a few small fragments of human bones, two small stone axes, and

portions of another jaguar's skeleton, and some dog's teeth, showing that such an interment of animals was not a matter of chance.

On the west side of the southern portion of the plaza is a long mound (No. 5) which proved to be the remains of two long single-chambered houses. Excavations showed portions of the walls of the chambers and the commencement of the horizontal arch of the roof. The square mound (No. 6) to the south of these houses does not appear to have supported any stone building, but there are traces of a low wall having enclosed the square space at the top. Near this wall were found some stones, shaped like skulls, and a stone serpent's head.

To the east side of the plaza is a detached square mound (No. 7) which formed the foundation of a house or temple, and beyond it is another mound (No. 8) of the same character, from which a low terrace runs out from the north and then turns at right angles to the west.

Turning now to face the main group of buildings at B, there rises in front a broad stairway, which as it ascends the slope divides into three separate flights of steps, each narrowing towards the top. The steps on the right and left lead to level terraces, the other steps must have led to the temple which stood at a still greater elevation in the centre. This building presented the appearance of a formless heap of stones, out of which a huge ceiba tree was growing. I dug out some portion of the chambers, which are shown in the accompanying plan (III.). The porches on each side probably extended some distance beyond the line of the walls of the building. The roof and superstructure had entirely disappeared, but the inner wall was in places perfect up to the spring of the roof.

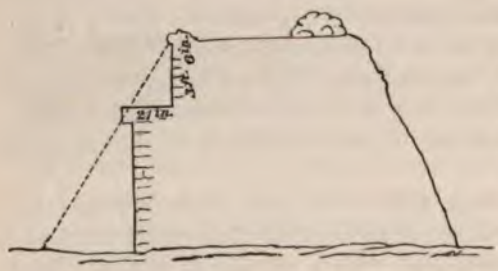
A step about 18 inches high and 16 feet long (A to B, plan III.), formed of two blocks of stone, projected in front of the inner doorway; the face of this step is ornamented with a number of figures seated cross-legged and covered with elaborate breastplates and other ornaments in sharp and well-preserved carving. A carved ornament, made up of several stones let into the wall, rises from this step on each side of the doorway and reaches to the top of the wall. This carving is, I believe, meant to represent a huge serpent's head without a lower jaw, but it is expressed in what by constant repetition had become a conventional form, and its meaning can only be made out by comparison with many other sculptures of a similar kind.

Above this curious ornament, and extending to a distance of seven feet on each side of the doorway (and probably continued over the doorway itself, although all trace of it had disappeared), runs an elaborate cornice, ornamented with seated human figures and hieroglyphs carved in medium relief. A similar ornament to the serpent's head already described occurs where a step descends into the southern porch at C to D, but, in this case, the face of the step is ornamented with a row of teeth, and it forms an under jaw common to the serpent's head on either side.

The walls of both the outer porches are ornamented with hieroglyphs and other carvings, but the stones are so much worn and displaced by the roots of trees that nothing can be made of them.

The slope from this building on the south side is so much broken up by roots of trees, and so thickly covered by fallen stones, that no trace of a stairway can be made out. There is, however, a distinct flight of steps (No. 9) from the terrace on the right of the house which leads down to a court, the floor of which is about 30 feet above the level of the great plaza to the north. In this court are an upright monolith and a square stone altar, both well carved, as well as numerous pieces of broken sculptures, which, no doubt, formed part of the exterior ornaments of the temples, or of the slopes of the foundations between the stairways.

An irregular square terrace (No. 10) projects into this court on the west side, and there are the remains of three stone houses overlooking the downward slope towards the west. At the south end of the court is a detached mound (No. 11) almost flat at the top. On digging into the north side of this mound I found a wall with a projecting coping, and, at the top of this, a shelf 21 inches wide surmounted by another wall three feet six inches high, reaching to the small square terrace on the top. This terrace is reached by a stairway on the east side, and it does not appear to have supported any building, but along its southern edge there lies a heap of stones, not large enough to be the remains of a house, but possibly marking the site of some ornamental wall or row of seats. Where the walls first mentioned are broken away they are seen to be built of only one layer of faced stone backed up with rubble.



On the east side of the court is the foundation (No. 12) of what must have been one of the most important temples, although excavation showed that the chambers of the building on its summit were small. The approach from the court is by a double stairway joining near the top. The space between the steps is built up with sculptured stones, the chief ornament being rows of what appear to be death's-heads. The step-like casing of masonry on this side is almost entirely hidden by the masses of stone and rubbish fallen from above. The upper part of this hill appeared to be no more than a rounded heap of broken blocks of stone bound together by the roots of trees, and I had little hope of finding traces of a temple or any other building. However, by digging and clearing with care, we were able to discover one chamber (IV.) with the walls in part

perfect to the height of six feet, and to find, on the north side, a staircase which must have led to an upper chamber, now altogether destroyed. In clearing the lower chamber we found a cross-legged headless figure which had been thrown down from the raised bench, at the east end, and a stone incense-burner which probably stood in front of it, and the remains of two pieces of rough pottery, which were probably used for burning offerings of incense. Two of the ornaments which I have called serpents'-heads were built into the wall above the raised bench, and a number of small human and grotesque heads formed the ornaments of a cornice round the wall about seven feet above the cement floor.

All traces of the front wall and doorway have been lost.

Descending the steps again into the court, and turning to the left, there is a narrow opening (→) between the south side of the foundation of the building last described, and a row of much ruined houses. To the south of this line of houses two slopes, with a broad terrace between, descend to the level of the plain; beyond this again are numerous remains of smaller buildings, hidden in the thick scrub, which do not need especial notice.

Towards the east end of the space between the row of ruined houses and the pyramidal foundation, a second narrow opening (→) leads to a passage between the east side of the foundation and a terrace (No. 13) above the river wall. This terrace is reached by a flight of steps in the centre of the slope, and is strewn with broken pieces of sculptured stone. At the south end of it is a raised foundation (No. 14) which once supported a roofed structure. At the east side of the terrace a few steps lead up to the broken masonry at the top of the river wall. This line of tumbled stones (No. 15) I examined with great care, and was successful in making out that it was the remains of a row of houses which had extended nearly the whole length of the terrace, the greater part of which had fallen away into the river below. At the north end of this row of houses there stands, facing a small court, another raised foundation (No. 16) which supported the most curious building the excavations brought to light—no doubt the same building which Palacio describes as a tower. Such a mass of stone had fallen down into the court below that the stone slope and steps leading up to the building were completely hidden. On the river side traces of a wall were found almost overhanging the broken cliff below, which here measures 107 feet from the level of the river. It is necessary to turn to the detail plans (V. and VI.) to form an idea of this curious building.

A platform or terrace nine feet wide runs in front of the building on each side of the doorway which is approached from the court by steps. Seven or eight feet inside the doorway another flight of steps commences and runs through to the back wall of the building, rising about 14 feet. At the distance of 4 feet 9 inches from the back wall other steps turn to the left, and lead up to a narrow landing which gives access on the

left to what seems to have been an upper chamber (A); only a small portion of the surface of the wall and the cement of the floor of this chamber can now be traced. The stairways were covered by parallel laid stone vaults, the spring of the vault is seen in Plan VII. The most curious feature of this building is the existence of chambers which have been purposely blocked up before the ruin commenced. These are coloured red in the plan. I cleared out the rough blocks of stone and earth which filled up the lower chamber on the north side of the steps and found the walls and cement floor almost perfect. It did not appear as if this chamber had ever been roofed in. I did not remove the stones at the opening towards the stairway, as these had been built up into a faced wall, and still supported some of the roof stones of the vault over the steps. In the same way the steps leading to the upper chamber on the right had been blocked up and the faced wall used as a support for the vaulting. These more recently built walls are coloured red in Plan VI. The only suggestion I can offer is that the builders were not satisfied with the stability of the parallel laid vaulting over such a large space, and had sacrificed the chambers in order to strengthen the roof.

Facing the north end of this building is another raised foundation (No. 17), which must also have supported a stone-roofed building. The flight of steps leading to the doorway in the centre can still be seen. Unfortunately, I had not sufficient time to excavate and examine this building.

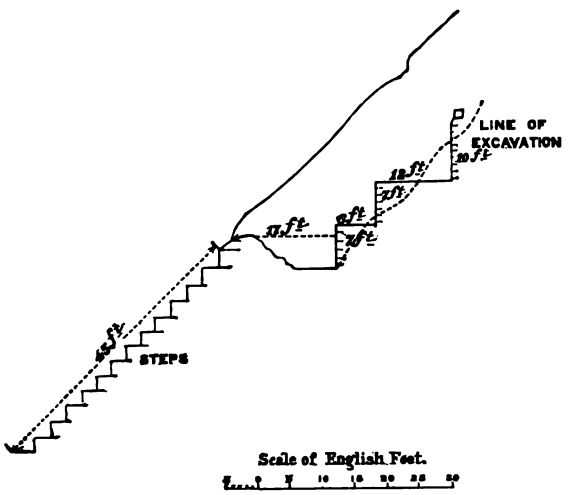
To the west of this foundation, on the north side of the court, is another building (No. 18, detail plan VII.) which gave the best results of all the excavations. A very well laid flight of steps formed of large blocks of stone, leads to a platform in front of the centre doorway. This platform runs along the front of the building, and, at each end of the house, is carried out at right angles as far as the line of the commencement of the steps. Two large grotesque faces and some handsome carved wing-stones extend across this platform to the head of the steps on either side of the doorway. The doorway itself is nine feet wide and was probably covered with a vaulted roof. In front of the doorway leading to the inner chamber is a step (A–B) 2 feet high and 15 feet long, carved on its face with hieroglyphics and skulls. At each end of this step (VIII.) is a human figure seated on a huge skull, supporting in its hand the head of what, for want of a better name, I shall call a serpent-man, whose body is turned upwards and is lost amongst the scrollwork and figures of a cornice which turns over the doorway. How the roof of the passage between one chamber and the other was supported is a mystery. It was covered by a number of blocks of stone, and not by a single stone slab; and yet these blocks are square at their edges, and could not have formed part of a true nor of a parallel laid arch. Possibly wooden jambs and architraves supported these blocks of stone, but, if so, all trace of them has disappeared. Plan VIII. is a sketch of this doorway, most

carefully restored, from photographs and measurements taken during the progress of the excavation, as well as after the excavation was finished. The inner chamber is without ornament. Two stone incense-burners shaped into grotesque heads and some patches of charcoal were found above the cement floor. The back wall of the house was only just traceable, and the outer surface of the front wall had almost disappeared; but that the latter must once have been elaborately ornamented is proved by the number of headless busts and other fragments of sculptured stone lying in all directions. I opened a passage (→) about four feet wide which passes between the west end of this house and another much ruined building, and on this west wall I was able to see some of the ornament, if not exactly in position, at least giving evidence of whence it had fallen. On the wall at the south-west corner of the building are the remains of a huge grotesque face made up of several stones, much the same in design as the faces which form the principal decoration of the buildings in Yucatan. However, the trunk-like nose, which has there so greatly exercised the speculative powers of travellers, if it existed here, cannot now be traced. Three human figures, standing out in full relief from the waist upwards, with the left arm held across the body and the right hand extended in front, palm outwards, were ranged along the upper part of the west wall; and broken pieces of similar figures, found in other places, lead me to suppose that this decoration was continued all round the house.

Almost in the centre of the court (on the north side of which the house last described stands) I turned over a large flat slab of stone (No. 19) which bore traces of sculpture on the upper surface and dug beneath it to the depth of 12 feet without finding anything worth notice. On the west side of this court are two flights of steps; those at the south-west corner (No. 20) are quite plain, but the centre stairway (No. 21) is ornamented on each side with large figures of rampant jaguars, carved out of several blocks of stone, which are built into the slope; and at the top of the stairway is a huge human head issuing from the jaws of an animal. These carvings are marked red in plan II.

On the level terrace above this stairway is an oblong space (No. 22) marked out by a border of stones, but there is no indication of any building having stood on it. Turning to the north along this terrace, and passing to the left of the ruins of some small houses, there remains now to be described the high foundation (No. 23) which projects furthest in this direction. A few steps, shown on the plan, lead from the terrace to the top of the foundation. Here I commenced to dig, in hope of finding at least portions of the walls of a building, but I met with no success. That a building must once have stood here is almost certain, from the presence of roof-stones, a few of which I found on the slopes. This foundation was ascended from the plain on the west side by a broad stairway (No. 24), and although many of the stones forming the steps

are now displaced, and the carving much worn, yet enough is still left to show the excellence, both of the design and workmanship. Each step was carved along its face with a line of hieroglyphs, and the stone-work at the edge of the stairway was covered with elaborate and curious ornament. This stairway could be traced up the slope for a distance of 45 feet. I again commenced to dig just above the spot where I thought the top step must have rested, and, after digging in at that level for 17 feet, through closely packed large rough blocks of stone and earth, came to a perpendicular wall. It was necessary to dig down some distance to reach the bottom of this wall, which we found to rest on a cement floor which ran outwards to the steps. The wall was seven feet high and without any coping or cornice, but it was covered at the top with a layer of cement six inches deep, which ran back for six feet, and formed a floor for another wall seven feet high; this wall again had a similar cement platform at the top, which apparently ran in



for 12 feet to meet another wall 10 feet high; above this I could make out nothing at all. I broke through one of the walls and removed a few of the faced stones, and found nothing but closely packed rubble behind it. My own impression is that these walls were built up merely to give strength to the foundation and guard against land-slips, and not to enclose any central chamber.

It is probably this method of building up walls of faced stone inside the foundations which has led to the belief that what has been called the great river wall was the original wall of this group of buildings, and was possibly intended for defence. The destructive force of the river, which has washed away so much of the foundations on the east side, has been somewhat checked on meeting these faced walls, and, at

the present time, the face of the cliff, if I may so call it, shows several patches of faced stone wall, one of them upwards of 100 feet in length and 20 feet to 30 feet in height. Careful examination shows that the edges of these patches pass in some places under the portions of the rubble of stone and mud of which all these foundations and raised terraces are built up.

Palacio in his description mentions the "two caves or passages the openings of which can be seen on the face of the river wall, and which have given to the ruins the name of 'Las Ventanas' or the Windows." The position of one of these passages is marked on the plan with a dotted red line (25–25). The floor of the passage is level, and the interior is faced with stone, and is just large enough for a man to crawl through. The top of the passage is a little below the level of the court; it was closed on the land side, and I think not intended again to be opened. A deep pit was dug here * by Colonel Galindo † (marked O in the plan) which now gives access to the passage.

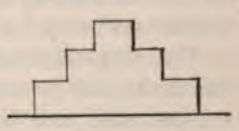
A few feet from the end of this passage, but at a greater depth below the level of the court, is the subterranean vault outlined in red in the plan, which was broken into by Colonel Galindo. The vault and passage do not seem to have had any connection with one another. I will now give Galindo's description of his discovery.

"Through a gallery scarcely 4 feet high and 2½ feet broad ‡ one can crawl from this square through a more elevated part of the temple overhanging the river, and have from the face of the precipice an interesting view. Among many excavations, I made one at the point where this gallery comes out into the square. I first opened into the entrance of the gallery itself, and digging lower down I broke into a sepulchral vault whose floor is 12 feet below the level of the square. It is more than 6 feet high, and 10 feet long, and 5½ feet broad, and lies due north and south, according to the compass. It has two niches on each side, and both these and the floor of the vault were full of red earthenware dishes and pots. I found more than fifty, many of them full of human bones packed in lime; also several sharp-edged and pointed knives of chaya (a brittle stone called *itzili* by the Mexicans), and a small head, apparently resembling death, its eyes being nearly closed and its lower features distorted. The back of the head is symmetrically perforated

* Stephens was wrong in saying this pit is faced with stone.

† Letter dated Copan, 19th June, 1834, from Colonel Juan Galindo, to the editor of the 'Literary Gazette' of London, printed in 'Literary Gazette' for 1835, pp. 456–7. A similar letter printed in the 'Transactions of American Ant. Society,' vol. xi. pp. 545–50.

‡ Stephen says 1 foot 11 inches at the bottom and 1 foot at the top, and in this form. I unfortunately overlooked the measurement, but think Stephens nearer the mark, as there is only just room to crawl through, and it is impossible to turn round in it.



by holes; the whole is of most exquisite workmanship and cut out or cast from a fine green stone, as are also two beads I found in the vault, with quantities of oyster and periwinkle shells brought from the sea-shore in fulfilment of some superstition. There were also stalactites taken from some cave. All the bottom of the vault was strewn with fragments of bones, and underneath these a coat of lime on a solid floor."

There is another similar passage lower down the cliff and further to the north. We made a ladder and succeeded in entering the passage and crawling to the further end, which we found closed with a stone wall. It is about the same length as the first passage described.

There are two other passages of the same kind near the top of the cliff which I was not able to get at, and they looked too small to crawl into. At some former time an excavation had been made to reach them from above, but the stones had fallen in again, and it did not seem as if any chamber could have been discovered.

In two of the detached mounds I found small vaults which had probably been used for burial purposes, but I was not fortunate enough to come upon any which had not previously been opened. At the foot of one of the stone monoliths in the plaza we dug up a number of stone beads, which were lying only a few inches underground; and a small stone ornament with a human face carved on it something like the one found by Colonel Galindo, and several fragments of similar ornaments. Single stone beads and flakes and chips of obsidian were from time to time picked up during the excavations.

Judging from the remains still to be seen at Copan it seems that art and probably civilisation had here attained as high a level as it ever reached in North America. The buildings are somewhat similar in structure and ornament to those which are found in more perfect preservation at Tikal and on the banks of the Usumacinta, and they also show a considerable resemblance to those in Yucatan. The hieroglyphic writing, it has long been known, is almost the same over all this region.

The village of Copan stands 1700 feet above the sea level, and during the months of March, April, and May the climate was almost perfect. The heat is of course considerable at midday, but the mornings, evenings, and nights were delightful. There is a good supply of water, and as the country is partly cleared of forest, and under cultivation, one was free from the cooped up feeling which is experienced when working in a small clearing in a tropical forest, as was the case at Quirigua. There are very few mosquitoes, but there is a still worse pest in the myriads of ticks which, at the beginning of the dry season, swarm over every leaf and blade of grass.

Unfortunately, soon after we set to work on my return from Chaal, war broke out between the Republics of Guatemala and Honduras on the one side and San Salvador and Nicaragua on the other. This

war seriously interfered with my work; a large body of troops was camped at Esquipulas, and as all the mules were taken up for war transport, I could not get the relays of stores and material I needed brought up from Ysabal. Nearly all my labourers were carried off to serve—very unwillingly—as soldiers, and I was left to work with such men as had passed the military age, and a few waifs and strays who had managed to escape the vigilance of the government officers.

Every now and then a report came that troops were marching towards the village, and my neighbours generally prepared to betake themselves to the bush with such few valuables as they possessed, and leave the village in charge of two or three cripples and some ancient ladies. It was only from predatory bands who might take advantage of the disturbed state of affairs that I myself looked for any trouble, but nevertheless it was uncomfortable, as the wildest rumours were flying about, and it was impossible to get any trustworthy information. My friends in the city of Guatemala wrote to me, most strongly urging me to beat a retreat to the coast, and added that it was quite impossible, in the dangerous state of the roads, to send me the silver I needed to continue paying my workmen.

But I determined to hold on, as I had most thorough confidence in the assistants whom I had brought with me, who were all old and tried companions. I did not, however, expect the confidence and support which I received from the villagers, who had looked upon me anything but favourably when first I came amongst them, and themselves bore a most unenviable reputation which I am delighted to have an opportunity to refute. For when I was reduced to my last dollar, not only did the men left in Copan and the neighbourhood volunteer to go on working for me, saying that they knew I would pay them when I could receive the money to do so, but they actually scraped together the few dollars which could be found in the village and lent them to me, so that I could pay off some of the workmen who were strangers and were obliged to return to their own homes.

Finally, a considerable battle was fought at about one-and-a-half day's journey to the south-west, in which President Barrios (who had always been a very good friend to me during my previous expeditions) was killed, and the war came to an end, and some of my labourers returned.

There was, however, another matter which caused me some anxiety and interfered seriously with the supply of labourers, which was that during the whole of my stay at Copan, an epidemic of small-pox raged in the neighbourhood. I am thankful to say that there were no cases in Copan itself, but I rode through some villages, but a few miles distant, which were altogether deserted, where the long rows of mounds, and the hastily made crosses by the roadside, showed the havoc which the disease had caused before the survivors had fled. The Alcalde of Comotan, the

nearest Indian town, told me that more than a hundred deaths were reported to him each week.

The transport of my moulds and baggage to the Port of Ysabal was a matter of considerable difficulty; however, eventually everything arrived safely and was shipped for London. Mr. Guintini is now employed making casts of the Copan sculptures for the South Kensington Museum, where some results of the work can already be seen.

The question, who raised these buildings at Copan, and when and why were they abandoned, cannot in the present state of our knowledge be answered satisfactorily. But it seems clear that Copan, Quirigua, Palenque, Tikal, and the ruin on the Rio Usumacinta (which I shall still call Menché, although I am by no means satisfied with that name) must have been abandoned before the Spanish discovery of America in 1492.

With regard to Copan, the first notice we have of it is a letter, already quoted, written by Diego de Palacio in 1576; that is, within fifty or sixty years of the time when the Spaniards first set foot in this part of the country.

We know, then, for certain from this letter that the ruins must have been abandoned long before 1576, and that the Indians then living near them showed no signs of the civilisation or skill which would have enabled them to execute such works.

I have not been able to find out at what date the ruins at Quirigua first became known to the Spaniards; but it is clear that they never heard of a living town where the ruins are now found. A comparison of the sculptures alone would lead one to suppose that Quirigua was of earlier date then Copan.

It will be remembered that at Quirigua I found no traces of stone houses or temples, but this was probably owing to my not knowing what to look for, or where to direct my search. I am now of opinion that it is very likely that some remains of stone-roofed buildings may be found there, but they certainly could not have been as numerous or as highly ornamented as those of Copan, for I saw no fragments of sculptured building stones such as are found in all directions at Copan. If I am not able to revisit Quirigua, I sincerely hope some future traveller will devote especial attention to this point, and I believe he will be rewarded with some interesting discoveries.

From an historical point of view, the solution of the question whether Quirigua, Palenque, Tikal, or Menché existed as living towns at the time of the Spanish conquest, depends much on the examination of the records of the march of Cortez from Mexico to Honduras. It was a march of unparalleled difficulty and hardship. When the expedition was crossing the delta of the river Tabasco, it must have passed within a few leagues of Palenque, but although Cortez had been furnished by the chiefs of Tabasco with a map, showing the principal towns through

which he would pass on his march, and although at this time his companions, worn out with hunger and fatigue, would have been keenly alive to any indications of the approach to a town where rest and food could have been obtained, no mention whatever is made of any town where the ruins of Palenque are now found.

Again, when the expedition crossed the river Usumacinta somewhere near Tenosique, the natives persuaded Cortez not to follow up the course of the stream as he proposed doing, and gave as a reason for their advice that there was only uninhabited forest in that direction; that is in the direction where Menché, one of the finest groups of ruins, is now found.

On crossing the Usumacinta Cortez was directed to the province of Acala, which he describes as very rich and prosperous, with well-built pueblos and many idol houses, and he thence marched on to the lake of Peten and the Island of Tyasal (the modern Flores), which was then the stronghold of the warlike Itzaes. The description of Tyasal is not given in much detail either by Cortez or Bernal Dias; however, we are given clearly to understand that it was the capital of the Itzaes, who were the supreme masters of the lake borders and the country around.

From Peten the expedition marched to the mouth of the Rio Dulce without meeting with any signs of civilised races; indeed, we know that they must have been passing through the lands of the Manchés and Choles whom I have already mentioned when speaking of Chaal. When at last Cortez had successfully led his expedition to San Gil on the Rio Dulce, where he found the Spaniards who had arrived by sea, and of whom he had come in search, the whole number of them were in such imminent danger of starvation that expeditions were made in all directions in search of food.

One of these foraging parties of Indians and Spaniards, headed by Cortez himself, landed near the site of the present village of Ysabal and marched two leagues inland, so that they could not have been many miles distant from Quirigua, but they neither saw nor heard anything to induce them to go in that direction, not even well-worn tracks, which must surely have been met with had Quirigua then been the centre of a large population. They turned off to the west and clambered along the rugged mountain sides until they found the food they needed at the pueblo which Cortez called "Chacujal," near the right bank of the river Polochic.

They were directed to this town by the signs of an Indian woman whom they captured in the neighbourhood, and whose language they could not understand.

I have lately found out that the name "Chacujal" has very nearly the same sound as the Indian words for "dry (or ripe) maize," and no doubt Cortez mistook these words for the name of the town.

To quote Cortez's own description of this town, he says, "We arrived

at the great square where they had their mosques and houses of worship and we saw the mosques and buildings round them just in the manner and form of those at Culua, and we were more overawed and astonished than we had been hitherto, since nowhere since we left Acala had we seen such signs of policy and power." And again, "The town was well designed, the houses well built and close to each other."

As I have already stated, I last year spent a day amongst these ruins on my way back from Chaal to Ysabal. The level ground between the two streams (Rios Tinaja and Pueblo Viejo) is covered with the raised stone foundations of houses, as Cortez says, "well ordered and close to each other."

These remains are quite different from those at Quirigua or Copan. The stonework is different and inferior. The foundations are from five to ten feet high, and none that I examined had ever supported stone-roofed buildings. On the flat tops of the foundations are low stone walls, not more than two feet high, marking the exact position of the houses; the walls are sometimes well preserved, and show numerous openings for doorways. Against these walls no doubt stood the posts which supported a thatched roof.

Some of these foundations are 50 feet long and not more than eight feet wide, and it seems almost impossible that any people could by free choice have built houses of such uncomfortable dimensions. However, this difficulty disappears if we look upon the people of Chacujal as the descendants of men who built stone-roofed houses of the Copan or Menché type; there the dimensions were fixed owing to the nature of the material and their imperfect knowledge of construction; here we may look on them as still clinging to the old forms after the art of stone building had passed away.

Now it is this thatch-roofed town of Chacujal of which Cortez says that he had seen nothing so imposing since leaving Acala, and this implies that it must have been superior to Tyasal, so that there is some reason to suppose that Tyasal also was but a thatch-roofed town, and of this there is also evidence from another source.

Of Acala we have no further knowledge, and even the sites of the towns are now unknown. The province was probably devastated in one of the later expeditions from Yucatan.

With Tyasal the case is different, for although the Itzaes were not subdued and Tyasal captured until the year 1700, when every trace of native buildings was swept away, we have continuous notices of it from the date of Cortez' visit to the year of its destruction, from the Franciscan missionaries who made ineffectual attempts to convert the natives to Christianity, all of which is chronicled in Villagutierez' 'History of the conquest of Itza.' Writing at the date of the destruction of Tyasal, Villagutierez gives a full account of the extent of the power of the Itzaes, the names and number of villages under their control, and a description

of Tyasal itself, and of its two principal "cues" or temples. These temples he describes as buildings with thatched roofs, supported on wooden posts raised on stone foundations.

In my former paper I gave an account of the ruins at Tikal, which lie only about 20 miles to the north-east of the Lake of Peten, and are in some respects the most remarkable and the most imposing of all the ruins I have yet examined. The missionaries and other Spaniards, in their numerous journeys from the north of Yucatan by way of Tipu to Tyasal, must have passed at times almost over the site of Tikal, yet no mention whatever is made of it. The friendly Indians at Tipu, who lived not more than 20 miles distant, never appear to have mentioned it, and we hear nothing of it at the time of the conquest of the Itzaes, when all the towns and villages in the neighbourhood are named and enumerated.

But is it within the bounds of possibility that a town like Tikal with its numerous stone houses, its fine stone-cased terraces, its temples raised on great pyramidal foundations (one measuring nearly 300 feet from the ground to the summit), with its fine wood and stone carvings, all of which must have taken hundreds of active minds and thousands of skilled hands to have raised and perfected and kept in order, could have been a living city at the time when a barbarous and unskilled race like the Itzaes, living in houses of wood and thatch, dominated the country, and that the Spaniards who knew all about Tyasal and the Itzaes, and the extent of their power and dominion, should altogether have failed to hear anything about Tikal?

Only one conclusion appears possible, which is, that Copan, Quirigua, Palenque, Menché, and Tikal were all deserted and buried in the forest before the Spaniards entered the country, and that the great tract of country over which these ruins are scattered, was then inhabited by such races as the Itzaes and the inhabitants of Chacujal, who, if they were the descendants of the builders of these wonderful pueblos, had lost the power, the skill, and the culture to which these broken sculptures and ruined edifices alone bear witness.

The north of Yucatan is thickly covered with ruins of great buildings, even superior in some respects to those found in other parts of Central America, and, as has frequently been pointed out, we have abundant evidence from the earliest Spanish writers that some of these buildings were inhabited by Indians when the Europeans first saw them. This, however, is a general statement which appears to me misleading, and I should prefer to state the case thus:—whereas in Central America the evidence is sufficient to show that the ancient centres of civilisation had been totally abandoned at the time of the Spanish conquest, and that the inhabitants of the country had changed or had gone back to a lower state of culture, the evidence in regard to Yucatan merely proves that some few of the great stone buildings were still inhabited

or made use of, but leaves it probable that the people were in a state of decadence, that they had almost ceased to be builders, and had abandoned many of the wonderful stone edifices raised by their ancestors, although they still clung to some which were particularly useful, or were venerated on account of their sanctity.

No explanation, supported by sufficient evidence to render it acceptable, seems to have been advanced either to account for the total abandonment of the Central American pueblos, or the decadence of the race in Central America or Yucatan. But I may add, that judging from the condition in which I found the sculptures in the Central American pueblos, it is difficult to believe that those towns were destroyed by act of war.

Before closing this paper, I will add some few remarks on the sculptures and hieroglyphs which can be illustrated without much difficulty.

One of the facts which has made most impression on me is the frequency with which the serpent symbol, usually the plumed serpent, is used in these sculptures, though less often at Quirigua than elsewhere.

I have already mentioned the scrollwork derived from serpents' heads, which I found on the walls of three out of the four temples at Copan. One form of this ornament can be seen in VIII., where the serpent's head is supported in the hand of the seated figure. IX. is a good example of the more conventional form carved on the side of what I suppose to be an altar at Copan. The exaggerated length of the upper jaw and the plumes under the chin should be noted in IX., X., and XI.

X. is a carving on the wooden lintels taken from one of the temples at Tikal. I have not seen the original sculpture, which is, I believe, now in the museum at Basle. The sketch here given is taken from an illustration in 'Les Anciennes Villes du Nouveau Monde,' by M. Désiré Charnay, who however does not attach the same significance to this carving. On the left of the illustration a human or grotesque head and hand can be seen issuing from the serpent's mouth, and the plumed body of the serpent with its characteristic markings is arched upwards so as to form a sort of framework over a human figure with an elaborate feather head-dress, a shield on one arm, and a plumed staff in the right hand. The ornaments at the top and bottom of this carving, which are here only slightly indicated, are also derived from serpents' heads.

XI. shows one of the numerous forms in which the serpent occurs at Menché.

XII. is a serpent's head hieroglyph found both at Quirigua and Copan.

The well-known cross on the Palenque tablet figured in Stephens's 'Travels in Central America' will on careful examination be seen to be altogether made up of serpent symbols—a serpent's head being distinguishable as forming the end of each arm of the cross.

Examples could be multiplied indefinitely, and a reference to

Stephens's travels will show how frequently the plumed serpent occurs as an ornament in the magnificent cornices and stairways amongst the buildings in Yucatan. The serpent symbol is also of frequent occurrence in the Maya MSS.

I am of opinion that the tables of hieroglyphs should be read *in double columns, from left to right and from top to bottom;* but I am not in this paper able to give fully the evidence on which this opinion is formed. One of the most interesting points which I have noticed is that all the inscriptions which I have reason to believe are complete from the commencement, are headed by what I shall call an initial scroll (the type of which is permanent throughout many variations), and begin with the same formula, usually extending through six squares of hieroglyphic writing. The sixth square, or sometimes the latter half of the sixth square, being a human face, usually in profile, enclosed in a frame or cartouche.

XIII. is the commencement* of an inscription on the side of a monolith at Quirigua. Each square is composed of two parts, and in this instance each part represents a natural or grotesque face. Counting from left to right, in double columns from top to bottom, the head in profile in a frame will be found in the second part of the sixth square. This marks the end of the formula to which I wish to call attention.

XIV. is also the commencement of an inscription from a monolith at Quirigua. In this the two glyphs, which in XIII. are placed in the same square, form each a separate square, so that in reading in double columns from left to right and top to bottom in the same manner as before, the face in the frame will be found in the twelfth square.

If these two inscriptions, Nos. XIII. and XIV., are carefully compared it will be seen that they correspond in other particulars. One of the features most easily distinguished is the curl from the lower jaw in the second half of the fourth glyph of XIII. which corresponds with the eighth glyph of XIV.

XV. is the commencement of the inscription from a tablet found in what has been called the Temple of the Sun, at Palenque. Here the first six squares stand out distinctly by themselves, and then the glyphs which follow separate into a double column. This cut is copied from an illustration in Stevens's 'Travels,' and cannot be relied on as very accurate in detail. In the sixth square the cartouche can still be seen, but the face which was probably inscribed in it has been worn away.

XVI. is the commencement of an inscription from a monolith at Copan. In this case one glyph from each square appears to have been suppressed, and to five of the glyphs numerals are attached.

XVII. is taken from the side of a monolith at Quirigua. First note the usual initial scroll at the commencement. After this follow six squares of picture writing (?) which apparently represent the formula

* Only the commencement or upper portion of each inscription is given.

usually expressed in six squares of hieroglyphs. In square No. 5 is a remarkable head-dress, which is easily recognised in the same square in XV. The sixth square contains the usual face in profile more elaborately expressed than is usual in the hieroglyphic form. Below the sixth square the inscription is continued as usual in a double column.

I am only able to give here, very roughly, some few of the peculiarities of these incriptions which have already come under my notice. Much more careful observation and comparison from accurate drawings is needed before these and other sequences can be satisfactorily established, but it seemed to me worth while to point out that inscriptions written in the same character, and apparently containing similar passages, are still to be found over a large extent of country, and that they possess characteristics which render them valuable as material for study.

Before the reading of the paper :—

The PRESIDENT said that this was not the first time Mr. Maudslay had read a paper on his explorations in Guatemala. About four years ago he gave a description of his discoveries and adventures in another part of that interesting region, the past history of which was unknown. The drawings exhibited to the meeting evidently proved a former civilisation which had been violently interrupted and suspended. The meeting would be very glad to hear any explanation that could be given of the causes of that suspension. The ruins gave evidence of a knowledge of architecture perhaps not inferior to that of Mexico and Peru. Mr. Maudslay had been exercising his ingenuity on the subject, and perhaps he might now be able to revive in some degree the recollection of a lost civilisation.

After the paper,

Admiral LINDESAY BRINE said the vast extent of the ruins of Central America might be inferred when he said that twenty years ago, when he crossed the country, he heard of them wherever he went from the Pacific to the Atlantic, and through Yucatan. Remains of ancient temples and pyramidal altars existed practically from Panama to Nicaragua, all through Guatemala and Yucatan to Mexico. It was in 1840 that Mr. Stephens made his well-known journey into this region and drew attention to the so-called ruined cities. It was a great pity that the expression "ruined cities" had been used, because they were not cities but temples, certainly more than four hundred years old. The temples still remained almost uninjured, but the cities in which the Indians lived in those days were destroyed. They were probably wooden structures with thatched roofs, and now nothing remained of them. It was a very curious fact how very few people had travelled in that country. When he returned to New York he went to the publisher of Stephens's book. He (the publisher) said to him, "Is what we have published true? Mr. Stephens is the only person who has been there, except you;" and he was glad to be able to tell him how thoroughly accurate and unexaggerated Mr. Stephens's descriptions were. He trusted that the paper which had been read might induce other persons to investigate the ruins and hieroglyphics. He thought that the people who were in the country at the time of the Spanish conquest were the same as those who built the temples, and who even now worshipped idols to a most extraordinary degree all over the region. No doubt human sacrifices were offered there, and it was known that when Cortes took Mexico, the priests were in the habit of sacrificing human beings. The present Indians still retained much of their superstitious and idolatrous instincts. A priest at a village

near Quezaltenango told him that he had noticed the Indians showing remarkable fervour in the church, and he could not understand it, but it turned out that they had put one of their own idols at the back of the altar and were praying to that. His own Indians used regularly every morning to pray to the rising sun, and in the evening to the setting sun. He asked them why they did it, and they said that they asked the setting sun to come to-morrow, and thanked the rising sun for having come again. He hoped that some day a thorough investigation would be made into the whole subject of these Central American ruins and endeavours be made to interpret the hieroglyphics.

The PRESIDENT in moving a vote of thanks to Mr. Maudslay for his paper congratulated the meeting on having present two visitors to the district who had decisively come to different conclusions. It was from such difference of opinion that the truth was arrived at. Mr. Maudslay was very determined in maintaining his view that some of these great edifices in Copan were not merely temples, but the remains of stone houses, which must be referred to a civilisation previous to the arrival of the Spaniards. The civilisation appeared to have lost all its glory even when Palacio went there 300 years ago. At present Mr. Maudslay's argument seemed inexpugnable. If the ruins were merely those of temples, it was highly probable that there was a large population. A sparse population, such as was found there at the present time, could not have had the time, capital, or skill to put up the buildings; in fact the remains were positive proof that the country must have had a civilisation like Peru and Mexico. He hoped that Mr. Maudslay would revisit the country, and that others would join in the exploration and carry on a careful analysis of the picture sculptures, which evidently contained some meaning. Even in Europe the secret of the Etruscan writings had not yet been discovered, except in a very slight degree, but nothing was lost by trying, and certainly the whole problem of the early habitation of the country excited curiosity in the highest degree. The explanation surely could not be beyond the reach of human industry. At all events, Mr. Maudslay had carried the knowledge of these buildings and their uses further than any previous visitor had done, and it was to be hoped that before very long a meeting would be called to hear the result of still further explorations.

GEOGRAPHICAL NOTES.

German South-west Africa.—In 1884–5 an expedition was sent from Germany to examine the region of South-west Africa recently acquired by Herr Lüderitz. The expedition consisted of Dr. Schenck, Dr. Schinz, Herr de Jongh, Herr H. Pohle, and six miners. The region examined stretches along the coast from the Orange river to Walfish Bay (28½°–23° S. lat.), with a breadth of about 90 miles. The object of the expedition was mainly to discover what useful minerals, plants, and animals the region contained, and the formation of the country in connection therewith. A somewhat full narrative of the work of the expedition by Herr Pohle appears in No. VIII. of 'Petermann's Mittheilungen.' The result is decidedly negative. The entire want of rain and the scarcity of drinking water are obstacles to all attempts at colonisation. No minerals are found in any quantity sufficient to pay for

transport to Germany. The absence of vegetation renders animal and human life impossible. Herr Pohle recalls the words of the late Dr. Nachtigal with reference to the region:—"I would rather travel through the Sahara, where I should at least find oases, than make a single journey through this country."

Further News of Dr. Lenz's Expedition.—This enterprising traveller left Stanley Falls on the Upper Congo for Ujiji, viâ Nyangwé, at the end of April last. He expected to secure carriers at Ujiji for his contemplated journey through the unknown and difficult country lying between Tanganyika and Muta Nzigé. Mr. Bohnsdorf, General Gordon's old servant in the Soudan, goes with him, but his other European companion, Mr. Bauerman, was left behind at Stanley Falls, and has since descended the river.

Lieutenant Gleerup's Journey across Africa.—Lieutenant E. Gleerup, a Swedish officer in the service of the Congo Free State, has recently crossed Central Africa from the Congo to Zanzibar. He went out to the Congo towards the end of the year 1883, and after serving for a few months as chief of Kimpoko Station near Stanley Pool, removed to the upper river, and was for nearly a year in command of the remote station at the seventh cataract of the Stanley Falls, among the Arab slave and ivory-dealers. Left here for several months without supplies, he formed a resolution to return to Europe by crossing the continent to Zanzibar, and the influential Arab trader Tippoo Tib handsomely furnished him with the means of doing so. Armed with letters of recommendation from the generous merchant to all his stations on the route, Lieutenant Gleerup found little difficulty in completing the long journey, which occupied him (from Stanley Falls to the East Coast) six months.

British New Guinea.—We have received from the Queensland Government a valuable series of reports on British New Guinea from data and notes by the late Sir Peter Scratchley, Her Majesty's Special Commissioner. It contains a record of the proceedings which led to Sir Peter Scratchley's appointment, and of the results of his visits to the various parts of our new territory, his dealings with the people, the character and origin of disputes between whites and natives, with remarks on the climate and the economic capabilities of the country. Sir Peter remarks that as, on account of the climate, the natural resources of New Guinea can only be developed by means of coloured labour, the distribution of the natives, both as to population and disposition, is of paramount importance. With the exception of some portions of the north-east coast, he tells us, almost the entire littoral of the protected territory is inhabited. In the west and north-west, from the Fly river to Hall Sound, the natives are very numerous, the tribes are large, and a higher state of tribal development is reached than elsewhere. The soil is in some places extremely fertile. The natives inhabiting not only the coast, but also the high lands and valleys from Port Moresby to

Kerupanu, are numerous, peaceable, and show themselves willing to adopt European ideas with regard to labour, &c. At Aroma, Cloudy Bay, Milport Bay, and Toulon Island, the natives are very numerous, and their physique finer, but they are not to be trusted. The population from South Cape to Bentley Bay, and East Cape, is more scattered, the villages small and numerous, the people small in stature and of peaceable disposition. Very little is known of the natives on the north-east coast; although shy, they seem to be friendly; some of the villages are very large. Most of the islands in the Louisiade Archipelago and the D'Entrecasteaux group are thickly populated; the natives are, however, treacherous, and less to be trusted than those in the mainland. In most of the islands also, as well as on the mainland from South Cape to Bentley Bay, the natives have been and are cannibals. The climate, Sir Peter Scratchley states, is the greatest drawback to the European settlement of New Guinea; fever of a severe character is everywhere prevalent. Still he thinks that as settlement advances along the coast, the climate there, as has been the case on the North Queensland coast, will improve. There are a large number of rivers in the protected territory, and the whole of it, with the exception of the district round Port Moresby, seems to be well watered. The largest rivers are those which drain the basin of the vast level region which begins on the west side of the Gulf of Papua. The largest of these is the Fly river, and it is supposed that many of the smaller rivers are mere branches leading into the Fly. Owing to the action of the south-western monsoon, which blows during the healthy season, the mouths of these rivers are silted up with sand and mud, and are unnavigable. In Dyke Acland Bay, where there is a vast tract of level country, densely wooded, intervening between the coast and the highlands, which are very distant, the mouth of a very large river, not marked on any map, was discovered. In Milne Bay, two rivers not marked on any map, and apparently unknown, were discovered and explored. The first river (native name Davadava) was discovered in the north-east of the bay, and was explored for a distance of about six miles. The banks were steep and precipitous, with rank vegetation and timber; the depth was 8 to 12 feet, with a small bar at the mouth. The other river (native name Hadava) was a very large one, and apparently led into the heart of the country. There were several deltas at the mouth. The land on either side was flat and the soil very rich; the vegetation was very tropical and abundant, and the natives numerous and friendly; the depth was from 12 to 16 feet. The mineral resources of the country, both as to kind and quantity, are still a matter of conjecture. It is the opinion of Mr. H. O. Forbes, based upon his geological observations, that gold will not be found to the westward, but might be among the high country and the Milne Bay district, and on the north-east coast. As to the general characteristics of the British territory, the report goes on to

state that a central range of mountains, running north and south, forms its backbone. The highest point in this range is supposed to be Mount Owen Stanley. Leading to the base of this central range on either side, east and west, is a series of high ranges or spurs, whose sides are covered with dense tropical forest of a virgin growth. Interspersed among these ranges are open valleys, full of rich deep soil, table-lands, patches of open country covered with coarse grass, and craters evidently formed by recent volcanic action. Many of the hill-sides and valleys have been cleared, fenced, and cultivated by the natives. The character of the vegetation, especially on the coast, and in many cases of the soil also, is entirely Australian; towards the interior, however, it becomes more tropical, both as regards its character and density. Such are a few of the points of geographical interest in Sir Peter Scratchley's Report; there is much more about the industrial capabilities, the native land system, the present and future administration, which deserves attention.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris, June 18th, 1886: M. A. GERMAIN in the Chair.—The Chairman stated that a letter had been received announcing the death of M. José Carlos Mano, geologist and archæologist, who died on board the *Saint-Simon* on 30th April last. M. Germain also alluded to the death of M. Louis Simonin, who had been a member of the Society since 1865.—M. Ant. d'Abbadie, of the Institute, presented a pamphlet by M. Bertelli entitled 'Réponse aux objections contre les observations microséismiques.' This little work gives the results of the author's observations during sixteen years of the movements of a wire pendulum the positions of which were ascertained by the aid of fixed microscopes. The movements of this pendulum he maintains are connected with earthquakes. They appear to be influenced by the distance and position of the moon, and are most frequent in the winter months and when the barometer is falling. An important movement preceded by an hour the earthquake which occurred at Florence in March 1872, and another was observed on 20th and 21st March, 1883, appearing to announce the eruption of Etna on the 22nd. The practical object of these observations is to determine the possibility of predicting earthquakes.—MM. Capus and Bonvalot sent a short account of their recent journey in Persia.—M. Ach. Gauroy, naval lieutenant, wrote from Brest intimating his desire to undertake a scientific mission to Laos; the objects of the expedition would be (1) the exploration of the Song Maa, as a possible channel for introducing French goods into Yun-nan; (2) the discovery of a commercial route between Tongking and the principality of Luang-prabang.—A communication was read from M. René Allain, calling attention to the resources of Algeria. His observations relate chiefly to the district of Biskra and the country south of Ued-rirh. Since the French occupation of the country, Ued-rirh, with its capital Tuggurt, has made rapid strides. It now comprises forty oases, inhabited by a population of 13,000 souls.—M. Hangsen-Blangsted forwarded a memoir on the Zaffarine Islands, situated near the frontier of Algeria and Morocco.—The Minister of Public Instruction forwarded a short article on the Adumas prepared by M. D. Manas, late agent of the West African Mission.—A letter was read from M. le Myre de Vilers, French Resident-General in Madagascar, regarding the desirability of adopting some uniform orthography for Malagasy names of places. The letter,

which was addressed to the Minister of Foreign Affairs, recommends the adoption of M. Alfred Grandidier's suggestions on the question.—M. Fred. Schwatka wrote from New York on 31st May announcing his intention to undertake an exploration of the St. Elias Alps in Alaska. The scientific portion of the expedition would be under the direction of Dr. William Libbey, jun., professor of physical geography at Princeton College.—The Chairman announced that the Hungarian traveller, M. Arthur, was present at the meeting, and that he had promised to give an account of his travels in Corea, Japan, and China at the second meeting of the Society in July. —M. Jackson, the Society's Librarian, laid on the table on behalf of the publishers (MM. G. B. Paravia & Cie., of Turin) the first part of a new atlas of geography for use in schools, which he said was well executed and of moderate cost.—M. L. Drapeyron presented a work, of which he is the author, entitled 'La géographie et les humanités, nouvelle méthode d'enseignement géographique; l'agrégation de géographie (1886) . . . .' He advocates the establishment of a geographical fellowship. —M. Schrader presented the third sheet of his map of the Pyrenees: the map is in six sheets.—The Chairman announced the return to France of M. Désiré Charnay from his recent journey in Yucatan, and called upon him to give a brief *résumé* of his journey. The traveller then gave an outline of his work in Yucatan, and stated that he would read a paper before a future meeting of the Society.—In conclusion, the General Secretary read a telegram which had just arrived, giving news of M. G. Révoil, who is now on the Somali coast. The traveller has failed to penetrate into the lake region of the interior.

——— 2nd July, 1886: M. A. Germain in the Chair.—The Commercial Geographical Society of Nantes intimated that the eighth Congress of the French Geographical Societies would be held in that town from the 4th to the 9th August. —The Society of the "arrondissement" of Avesnes, which forms part of the Geographical Union of the North of France, announced that on 11th July a geographical exhibition would be opened which would have special reference to the teaching of geography in schools.—It was also announced that an exhibition of the collections made by the West African Mission under the direction of M. Savorgnan de Brazza had been opened on the 30th June by the Minister of Public Instruction at the Natural History Museum of Paris; it would remain open till the 18th of the month. The exhibition was most interesting as it dealt with the natural history and ethnography of the immense territory between the Congo and the Ogowé.— M. Levasseur presented the first number of the 'Bulletin de l'Institut International de Statisque." This Institute was, he said, founded in London last year with the object of forming a bond of union between statisticians of all nations.—Dr. Rouire forwarded a copy of the paper recently read by him before the Academy of Sciences, embodying the results of the geographical observations made by him in the course of his last explorations in Central Tunis. He affirms the existence of what he calls "un grand cul-de-sac maritime" or lagoon at the end of the Gulf of Hammamet; into this lagoon a river discharges itself which gathers up all the waters of Central Tunis. He has discovered a well-defined little island in the middle of the lagoon. He is of opinion that the Sebkha Halk-el-Mengel was navigable at one time.—A communication was read by M. René Allain upon the inhabitants of Anam, Cambodia, and Tongking.—The Minister of Public Instruction forwarded despatches dated 9th April and 3rd May from M. Thouar. The traveller was on the point of leaving Tarija on his canoe voyage down the Pilcomayo.—The Chairman intimated that the Japanese minister, Prince Hachisuka, was present at the meeting.—In conclusion, Dr. Hamy read a paper on one of the Copan monuments. A long discussion followed in which MM. de Quatrefages, de Villemereuil, and Comte de Charency took part.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

ASIA.

China.—Imperial Maritime Customs. 1. Statistical Series: Nos. 3 and 4. Returns of Trade at the Treaty Ports, and Trade Reports, for the year 1885. Published by order of the Inspector-General of Customs. Shanghai, Statistical Department of the Inspectorate General of Customs; London, P. S. King & Son, 1886: 4to., pp. 27, vi., and 432, diagrams.

Cochinchine Française.—Excursions et Reconnaissances, XI., No. 26. Mars–Avril, 1886: Saigon, Imprimerie Coloniale, 1886.

In this number there is a note by Lieut. Paul Campion on the French islands and coasts of the Gulf of Siam. M. Etienne Aymonier continues his Notes on Annam, dealing in the present number with the province of Khânh Hôa; while M. A. Landes has a sixth instalment of his Annamite stories and legends.

De Groot, [Dr.] J. J. M.—Het Kongsiwezen van Borneo. Eene Verhandeling over den grondslag en den aard der Chineesche Politieke vereenigingen in de Koloniën, met eene Chineesche Geschiedenis van de Kongsi Lanfong. Uitgegeven door het Koninklijk Instituut voor de Taal-, Land- en Volkenkunde van Nederlandsch-Indië. 's Gravenhage, Martinus Nijhoff, 1885: 8vo., pp. viii. and 193, maps.

Geary, Grattan.—Burma, after the Conquest, viewed in its Political, Social, and Commercial Aspects, from Mandalay. London, Sampson, Low, & Co., 1886: 8vo., pp. xvi. and 345. Price 7*s.* 6*d.*

[India.]—Selections from the Letters, Despatches, and other State Papers preserved in the Bombay Secretariat. Marátha Series, Vol. I. Edited by George W. Forrest, B.A. Bombay, Government Central Press, 1885: 4to., pp. ii., xxxiv., 729, iv. [Presented by the Bombay Government.]

This volume contains, among other things, the Diary of C. W. Malet on a journey from Bombay to Calcutta in 1785–86.

Morgan, E. Delmar, and Coote, C. H.—Early Voyages and Travels to Russia and Persia. By Anthony Jenkinson and other Englishmen. With some account of the first intercourse of the English with Russia and Central Asia by way of the Caspian Sea. London, printed for the Hakluyt Society, 1886: 8vo., two vols., vol. i. pp. clxii. and 1–176; vol. ii. pp. 177–496.

Mr. Delmar Morgan and Mr. Coote began this undertaking together, but Mr. Coote soon retired, and Mr. Morgan is virtually the responsible editor. The whole of the long introduction is from Mr. Morgan's hands, and does him credit. As a history of early exploration in Western and Central Asia it is unique, and is evidently the result of long, patient, and minute research. Without going into unnecessary details Mr. Morgan gives just so much of the previous intercourse between England and Russia, and of the early history of Russia itself, as will enable the reader to understand the carefully edited narratives of the travels of Jenkinson and contemporary Englishmen. With regard to Jenkinson himself, Mr. Morgan in the most persevering fashion has hunted down every clue to his early history and connections, his later days, and his descendants. The value of Jenkinson's own narrative, Mr. Morgan justly points out, lies in the fact that it "bridges over the lapse of years between the travels of Rubruquis and Marco Polo in the 13th century, and those of English and Russians in the 18th century, a long period of uncertainty and vagueness in the accounts of Central Asia." In his criticisms both of Jenkinson's geography and of his map, Mr. Morgan shows much common sense and shrewdness, and so far as we have tested it, the text seems edited with great care.

Perucca, A.—In Birmania. Note di Viaggio illustrate di Aristide Perucca. Roma &c., G. B. Paravia e Comp., 1886 : 8vo., pp. vii. and 111, map and illustrations.

Scott, James George.—Burma, as it Was, as it Is, and as it Will Be. London, George Redway, 1886 : 8vo., pp. viii. and 184. Price 5*s*.

Mr. Scott's little volume opens with a brief sketch of the history of Burma, commencing with the native theories and tracing events down to the British conquest in November last. The historical sketch is followed by a geographical description of Upper and Lower Burma ; while the third and last portion of the volume furnishes an interesting account of the people, including the Burmese kings and officials, together with some instructve remarks on the hill tribes.

AFRICA.

Paulitschke, [Dr.] Philipp.—Die Sudanländer nach den gegenwärtigen Stande der Kenntniss. Freiburg-im-Breisgau, Herder, 1885 : 8vo., pp. xii. and 311.

This is a readable and instructive *résumé* of our knowledge of the whole of the Sudan region. After a brief introductory sketch of the geography of the region, Dr. Paulitschke devotes a chapter to the history of discovery in the Sudan. In the following chapters he deals in some detail with the Western Sudan—the Mandingo country and the Felata kingdoms ; the Lake Chad countries—Bornu, Kanem, Bagirmi, Wadaï ; the Nile region—Dar Fur, Sennaar, Bahr-el-Ghazal, the late Egyptian Equatorial Provinces, the Niam-niam, and the Mongbuttu country. Appended is a list of the most important recent publications and maps on the Sudan. There are numerous illustrations and one map on the scale of 1 : 11,500,000.

[Rogozinski, S. S.]—Pod Równikiem. Odczyty S. S. Rogozinskiego wypowiedziane w Sali Radnéj miasta Krakowa. [Near the Equator. Lectures at the Town Hall of Cracow.] W. Krakowie, 1886 : small 8vo., pp. 159. [Presented by the Author.]

Schweinfurth, G.—Ueber die geologische Schichtengliederung des Mokattam bei Cairo. 1883 : 8vo., plate.

——— Alte Baureste und hieroglyphische Inschriften im Uadi Gasûs. Mit Bemerkungen von Prof. A. Erman. Berlin, Verlag der K. Akademie der Wissenschaften, 1885 : 4to., pp. 28, map and plate.

——— Reise in das Depressionsgebiet im Umkreise des Fajûm im Januar 1886. Berlin, 1886 : 8vo., pp. 54, map.

——— Sur une ancienne digue en pierre aux environs de Hélouan. Le Caire, J. Barbier, 1886 : 8vo., pp. 7, map and plate.

——— Les ateliers des outils en silex dans le Désert Oriental de l'Égypte.—Sur la découverte d'une Faune paléozoique dans le grès d'Égypte.—La Vraie Rose de Jéricho (Asteriscus pygmæus Coss. et Dur.)—Les dernières découvertes Botaniques dans les anciens tombeaux de l'Égypte. Le Caire, J. Barbier, 1886 : 8vo., pp. 60.

The above five pamphlets were presented by Dr. G. Schweinfurth.]

AMERICA.

[America, United States.]—Department of the Interior. United States Geological Survey, J. W. Powell, Director. Bulletins of the United States Geological Survey, Nos. 24-26. Washington, Government Printing Office, 1885 : 8vo. [Presented by the Director of the U.S. Geological Survey.]

No. 24. List of Marine Mollusca, comprising the Quaternary Fossils and Recent Forms from American localities between Cape Hatteras and Cape Roque, including the Bermudas. By William Healey Dall.—No. 25. The Present Technical Condition of the Steel Industry of the United States. By Phineas Barnes.—No. 26. Copper Smelting. By Henry M. Howe.

[America, United States.]—Engineer Department, U.S. Army. Tables of Geographic Positions, Azimuths, and Distances, together with Lists of Barometric Altitudes, Magnetic Declinations, and Itineraries of important Routes, prepared principally by First Lieut. M. M. Macomb, 4th U.S. Artillery, Assistant, from data gathered by parties of the United States Geographical Surveys West of the 100th Meridian, operating in the States and Territories of California, Colorado, Nebraska, Nevada, Oregon, Arizona, Idaho, Montana, New Mexico, and Wyoming, under the direction of Captain Geo. M. Wheeler, Corps of Engineers, U.S. Army, in charge, 1883. Washington, Government Printing Office, 1885: folio, pp. 261. [Presented by the Engineer Department, U.S. Army.]

Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Conditions of the Institution for the year 1884. Washington, Government Printing Office, 1885: 8vo., pp. xxxvii. and 904. [Presented by the Smithsonian Institution.]

The first part of the Report is occupied with the Proceedings of the Board of Regents of the Smithsonian Institution for the Session of January 1885; the Report of the Executive Committee for the year 1884; and the Annual Report of the Secretary. The General Appendix, embracing the greater portion of the volume, contains—I. Records of Scientific Progress for 1884, including the Introduction, by Spencer F. Baird; Astronomy, by Edward S. Holden; Vulcanology and Seismology, by Charles G. Rockwood; Geography, by F. M. Green; Meteorology, by Cleveland Abbe; Physics, by George F. Barker; Chemistry, by H. Carrington Bolton; Mineralogy, by Edward S. Dana; Bibliography of Invertebrate Palæontology, by J. B. Marcou; Zoology, by Theodore Gill; and Anthropology, by Otis T. Mason. II. Miscellaneous Papers, including papers relating to Anthropology; Antiquities at Pantaleon, Guatemala, by Charles E. Vreeland, J. F. Bransford; the Guesde Collection of Antiquities in Pointe-à-Pitre, Guadeloupe, by Otis T. Mason; Ancient Mounds in Clinton County, Michigan, by M. T. Leach; Ancient Forts in Ogemaw County, Michigan, by M. F. Leach; Sketch of Flint Ridge, Licking County, Ohio, by Charles M. Smith; and Earth-works and Mounds in Miami County, Ohio, by E. T. Wiltheiss. There are illustrations of the antiquities at Pantaleon, Guatemala; as also of the Guesde Collection from Guadeloupe.

Bancroft, H. H.—The works of Hubert Howe Bancroft. Vol. VI., pp. lxxii. and 704; VII., pp. xvi. and 766; IX., pp. cxii. and 702; X., pp. xiv. and 790; XI., pp. xv. and 780; XII., pp. xiv. and 829; XIII., pp. xiii. and 812; XV., pp. xlviii. and 751; XVIII., pp. lxxxviii. and 744; XIX., pp. xvi. and 795; XX., pp. xv. and 792; XXI., pp. xv. and 786; XXVII., pp. xxxiii. and 735; XXVIII., pp. xiv. and 768; XXXIII., pp. xxxviii. and 775. San Francisco, A. L. Bancroft & Co., 1883–1886: 8vo., maps.

Vol. VI. History of Central America: Vol. I. 1501–1530.—VII. History of Central America: Vol. II. 1530–1800.—IX. History of Mexico: Vol. I. 1516–1521.—X. History of Mexico: Vol. II. 1521–1600.—XI. History of Mexico: Vol. III. 1600–1803.—XII. History of Mexico: Vol. IV. 1804–1824.—XIII. History of Mexico: Vol. V. 1824–1861.—XV. History of the North Mexican States and Texas: Vol. I. 1531–1800.—XVIII. History of California: Vol. I. 1542–1800.—XIX. History of California: Vol. II. 1801–1824.—XX. History of California: Vol. III. 1825–1840.—XXI. History of California: Vol. IV. 1840–1845.—XXVII. History of the North-west Coast: Vol. I. 1543–1800.—XXVIII. History of the North-west Coast: Vol. II. 1800–1846.—XXVIII. History of Alaska: 1730–1885.

[Canada.]—British Association for the Advancement of Science. Montreal Meeting, 1884. Canadian Economics, being Papers prepared for Reading before the Economical Section, with an Introductory Report. Montreal, Dawson Bros.; London, Williams and Norgate, 1885: 8vo., pp. xxxv. and 350, map, diagram, &c. [Presented by the Montreal Committee.]

Peyret, Alejo.—Cartas sobre Misiones. Buenos Aires, Imprenta de La Tribuna Nacional, 1881 : large 8vo., pp. vi. and 284.

Stübel, Alphons.—Skizzen aus Ecuador, dem VI. Deutschen Geographentage gewidmet von Alphons Stübel. Berlin, Ascher & Co., 1886 : fol., pp. xiii. and 96.

This volume contains reduced zincographic reproductions of the fine collection of original pictures made in connection with Reiss and Stübel's long and fruitful travels in South America, and exhibited at the last German Geographentag, held at Dresden in April. There are 66 pictures in all, representing characteristic landscapes and views in the east and west cordillera of Quito, the east and west cordillera of Riobomba, Cotopaxi, the west cordillera of Latacunga, and other regions. Of the types of people exhibited only the titles are given here. Each picture is accompanied by descriptive text, and the whole forms an important contribution to topographical and physical geography, which ought to be of much use for teaching purposes.

GENERAL.

Bonwick, James.—French Colonies and their Resources. London, Street & Co., 1886 : small 8vo., pp. vii. and 152, map. Price 2*s.* 6*d.*

This is a useful little summary of facts relating to the French Colonies. It is divided as follows:—French America, including the islands of St. Pierre and Miquelon, lying off the south shore of Newfoundland; French West Indies—Guadeloupe, Martinique, Guyana, or Cayenne; French Asia, including French India, Cochin-China, and Tong-king; French Oceania, including Tahiti, the Tubai and Marquesas Isles, Gambier Archipelago, the Tuamotu Group, New Caledonia, the New Hebrides, and Kerguelen Island; French Africa, including Senegal, Guinea Settlements, the Gaboon, French Congo, Réunion, Madagascar Colonies, Obock, Algeria, and Tunisia.

Bonney, [Prof.] T. G.—Address delivered at the Anniversary Meeting of the Geological Society of London, on the 19th of February, 1886; Prefaced by the Announcement of the Award of the Wollaston Medal, the Proceeds of the Donation Fund, the Murchison Medal and Geological Fund, the Lyell Medal and Fund, and the Barlow-Jameson Fund for the same year. London, printed by Taylor & Francis, 1886 : 8vo, pp. 87. [Presented by the Author.]

Classified Index to the Maps in the Royal Geographical Society's Publications, 1830–1883. [By Richard Bliss.] Cambridge, Mass., issued by the Library of Harvard University, 1886 : 8vo., pp. 43.

This forms No. 17 of Harvard University Library Bibliographical Contributions, edited by the Librarian, Mr. Justin Winser. The Index, which is classified geographically, includes all the maps and plans published in the first and second series of the 'Proceedings,' the 'Journal,' and the 'Supplementary Papers' of the Society, as well as in 'Ocean Highways' and the 'Geographical Magazine.'

Colonial and Indian Exhibition, London, 1886. Handbooks, Catalogues, &c.

Special Catalogue of Exhibits in British Guiana Court. With Introductory Notes by G. H. Hawtayne, F.R.G.S., C.M.Z.S. London, W. Clowes & Sons, 1886 : 8vo., pp. 42, map.

Bibliography of South Australia, compiled by Thomas Gill. Glen Osmond, 1886 : 8vo., pp. 118.

Handbook and Catalogue. The West Indies and British Honduras. London, W. Clowes & Sons, 1886 : 8vo., pp. xvi. and 192, map, diagram, and illustrations.

Giglioli, Enrico Hillyer.—Ministero di Agricoltura, Industria e Commercio. Direzione generale dell'Agricoltura. Ufficio Ornitologico. Avifauna Italica.

Elenco delle Specie di Uccelli Stazionarie o di passaggio in Italia. Colla loro sinonimia volgare e con notizie più specialmente intorno alle migrazioni ed alla nidificazione. Firenze, coi tipi dei Successori Le Monnier, 1886: pp. vii. and 623. [Presented by the Author.]

Mueller, [Baron] F. von.—Select Extra-Tropical Plants, readily eligible for Industrial Culture or Naturalisation, with indications of their native countries and some of their uses. New Victorian edition, revised and enlarged. Melbourne, John Ferres, 1885: 8vo., pp. ix. and 466. [Presented by the Victorian Government.]

Report of the Fifty-fifth Meeting of the British Association for the Advancement of Science, held at Aberdeen in September 1885. London, John Murray, 1886: 8vo., pp. xcii., 1284 and 111, charts and plates. [Presented by the British Association for the Advancement of Science.]

Verbeek, R. D. M.—Krakatau. Publiée par ordre de son Excellence le Gouverneur-Général des Indes Néerlandaises. Batavia, Imprimerie de l'État, 1886: 8vo., pp. xl. and 567. With atlas of maps and album of chromolithographic views. [Presented by the Government of the Netherlands.]

The first part of this important collection of data in connection with the Krakatau eruption we have already noticed. The second and much larger part is paged consecutively with the previous part, which treated of Krakatau before the month of May 1883; the eruption of May 1883, and the activity of the volcano up to August 26; the eruption of August 26–28, and subsequent eruptions. In the second part there is a chapter on the causes of the eruption of 1883, with theoretical considerations on eruptions in general. The longest chapter deals with the phenomena which accompanied the eruption of 1883 under the headings of Earthquakes; Matters rejected—including sections on the geology of Krakatau and of the neighbouring islands and the Straits of Sunda, microscopical examination and chemical composition of the Krakatau rocks; Magnetic and Meteorological Phenomena; Movements of the Atmosphere; the Breaking-up of Mountains; Movements of the Sea. It is followed by a chapter on the volcanic phenomena observed during the eruption of Krakatau in other parts of the Archipelago, as well as beyond it. In a concluding chapter we find descriptions of the many fine maps and coloured illustrations which accompany the report, and this is followed by numerous notes and memoranda, which help to complete a report of great value to physical geography as well as seismology.

The following works have also been added to the Library:—

Beyrich, E.—Über geognostische Beobachtungen G. Schweinfurth's in der Wüste zwischen Cairo und Sues. Berlin, 1882: large 8vo., pp. 22, 2 maps. [Presented by Dr. G. Schweinfurth.]

[Palestine.]—Two Journeys to Jerusalem, containing, I. A strange and true Account of the Travels of two English Pilgrims some years since, and what admirable Accidents befel them in their Journey to Jerusalem, Gr. Cairo, Alexandria, &c. II. The Travels of 14 Englishmen in 1669, to Jerusalem, Bethlem, Jericho, the River Jordan, the Lake of Sodom and Gomorrah, &c. With the Antiquities, Monuments, and Memorable Places mentioned in Scripture. By T. B. To which are prefixed, Memorable Remarks upon the Antient and Modern State of the Jewish Nation. As, 1. A Description of the Holy-Land; its Situation, Fertility, &c. 2. The several Captivities of the Jews after they were possessed thereof. 3. Probable Conjectures of what is become of the Ten Tribes who were carried Captives by the Assyrians, with divers pertinent Relations pur-

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Ramsay, E. P.—Catalogue of the Echinodermata in the Australian Museum. Part I. Echini. Desmosticha and Petalosticha. Sydney, F. W. White, 1885: 8vo., pp. iii., ii. and 54, plates.

Ratte, A. Felix.—Descriptive Catalogue (with notes) of the General Collection of Minerals in the Australian Museum. Sydney, T. Richards, 1885: 8vo., pp. xii. and 221.

Tolstoi, Leon.—What I Believe. Translated from the Russian by Constantine Popoff. London, Elliot Stock, 1885: 8vo., pp. iv. and 236. [Presented by the Publisher.]

Urechi, Grégoire—Chronique de Moldavie depuis le milieu du XIV^e^ siècle jusqu'à l'an 1594. Texte Roumain avec Traduction Française, Notes historiques, Tableaux généalogiques, Glossaire et Table, par Émile Picot. [Vol. ix. of 'Publications de l'École des Langues Orientales vivantes.'] Paris, Ernest Leroux, 1878: large 8vo, pp. xxvii. and 662. [Presented by the French Minister of Public Instruction.]

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

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Central-Europa.—Neue Uebersichtskarte von ——, resp. der oesterreichisch-ungarischen Monarchie. Scale 1:750,000 or 10·3 geographical miles to an inch. Militär geograph. Institute, Wien. Sheets:—Kurze Anleitung zur Aussprache der in der Übersichtskarte vorkommenden nicht deutschen Namen.—West. A 2. Luxemburg, Metz, Chalons sur Marne.—C 4. Agram, Brod, Esseg, Glina, Knin, Sarajevo. Price 2*s.* each sheet. (*Dulau.*)

Deutschen Reiches.—Karte des ——. Scale 1:100,000 or 1·3 geographical miles to an inch. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1886. Sheets:—62, Barth; 519, Ratibor; 528, Aschaffenburg; 529, Lohr; 530, Würzburg; 605, Esslingen. Price 1*s.* 6*d.* each sheet. (*Dulau.*)

Schweizerischen Föhngebietes.—Übersichtskarte des ——. Von G. Berndt. Scale 1:925,000 or 12·6 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 83. Justus Perthes, Gotha, 1886. (*Dulau.*)

Scotland.—Reduced Ordnance Maps of ——, by J. Bartholomew, F.R.G.S. Scale 1:126,290 or 1·73 geographical miles to an inch. Islands of Mull, Staffa, Iona, &c.—Islands of Islay, Jura, &c.—Arataig District, Rum, Eigg, &c.—(Outer Hebrides) North Uist, Benbecula, Barra, &c. Edinburgh, A. & C. Black. Price of each, 2*s.* 6*d.* coloured, 3*s.* 6*d.* mounted on cloth.

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ASIA.

Indian Government Surveys:—

Indian Atlas: Quarter Sheet 48 S.E. Parts of Districts Dehra Dun, British Garhwal, Saharanpur, Muzaffarnagar, and Bijnor (N.W. Provinces), and Kurnal and Umballa (Punjab). 4 miles to 1 inch.—Map illustrating the distribution of the Principal Religions of India and British Burma. 80 miles to 1 inch.—Skeleton Map of India. 32 miles to 1 inch. 6 sheets.—Trigonometrical Branch, Survey of India. Sheet No. 13 of Káthiáwár (2nd edition). Parts of N. Káthiáwár, Ahmedabad, and Jhálávad. 1 mile to 1 inch.—Trigonometrical Branch, Survey of India. Sheet No. 40 of Gujarát. Scale 1 mile to an inch. Part of Panch Mahál's Collectorate, and of the Rewa Kántha States. Sheet No. 49. Parts of Khándesh and Násik Collectorates, of the Dáng States of the Khándesh Agency, &c.—Skeleton Map of the Panjab and surrounding countries. 32 miles to an inch.—The Provinces of Bengal, Behar, Orissa, and Chota Nagpore, under the jurisdiction of the Lieut.-Governor of Bengal. 32 miles to an inch.—Berar, or the Hyderabad Assigned Districts, 1885. 8 miles to an inch.—District Dacca. 4 miles to an inch. District Rungpore. 4 miles to an inch. North-West Provinces. 1 mile to 1 inch. Seasons 1868–69 to 1873–76. Sheet No. 30. (East) Districts Bijnor and Moradabad. No. 46. Districts Bijnor, Moradabad, Tarai, Garhwal, and Kumaun.—Oudh Revenue Survey. 1 mile to 1 inch. Seasons 1860–62. Sheet 121. Districts Unao and Lucknow. No. 123. Districts Rae Bareli and Unao.—Punjab Survey. 1 inch to a mile. Seasons 1856–57 and 1881–2. Sheet 40. Districts Dera Ismail Khan and Muzaffargarh.—Levels in the North-West Provinces. Sheet No. 12. Third edition.—Levels in the Punjab. Sheets Nos. 81 and 83. 2 miles to an inch.—**Indices:** Ajmere-Merwara.—Index to the Survey Operations in District Merwara.—Punjab Survey. Index to the Survey Operations in the Punjab.—N.W. Provinces Survey. Index to the Cadastral Survey of Dehra Dun.—N.W. Provinces. Index to the Cadastral Survey of District Basti.—N.W. Provinces Survey. Index to the Cadastral Survey of District Gorakhpur.—Index to the Sheets of the Gujarat Survey.—Index to the Sheets of the Cutch Topographical Survey.—Central Provinces Survey. Index to the Cadastral Survey of District Sambalpur. British Burma Survey. Index to the Cadastral Survey of District Akyab.—British Burma Survey. Index to the Cadastral Survey of Districts Bassein and Henzada.—British Burma Survey. Index to the Cadastral Survey of Districts Hanthawaddy, Pegu, Shwe-Gyin, and Toungoo.—Index to the Brit. Burma Survey. No. 7 Topographical Party.—Index to the Sheets of the Andaman Topographical Survey.—Index to the Garo, Khasi, and Naga Hills, and N.E. Frontier Survey.—Assam Survey. Index to the Cadastral Survey of District Kamrup.

AFRICA.

Afrika.—General-Karte von ——, von F. Handke. Nach den neuesten Materialien entworfen und gezeichnet. Neue Auflage Revedirt und ergänzirt von G. Herkt. Scale 1:14,500,000 or 198·6 geographical miles to an inch. Glogau, Flemming. Price 1*s.* (*Dulau.*)

Central-Ostafrika.—Karte von ——, von P. und J. von Wensierski. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Berlin: Engelhardt. Price 3*s.* (*Dulau.*)

Congo Beckens.—Karte des ——, bearbeitet und herausgegeben von Dr. Richard Kiepert. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Mit Angabe der von der Berliner Conferenz festgestellten Grenze des Freihandels-Gebietes, ferner derjenigen des neuen Congo-Staates und der Colonial-Besitzungen der Europäischen Staaten und der Neger-Reiche, sowie der hauptsächlichsten Reiserouten der Forschungs-Reisenden. Berlin, D. Reimer, 1886. Price 2*s.* 6*d.*

Lüderitzland.—Itinerar- und Trigonometrische Aufnahmen in ——, von H. Pohle. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 11. Justus Perthes, Gotha. (*Dulau.*)

Ost-Afrika.—Uebersichtskarte der mittleren ——, und der deutschen Erwerbungen. Deutsche Kolonialkarten No. 7. Weimar, Geograph. Institut. Price 1*s.* (*Dulau.*)

AMERICA.

North America.—Verteilung der Vegetations - Formationen Nord - Amerikas. Nach C. S. Sargent. Scale 1:25,000,000 or 342 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 12. Justus Perthes, Gotha. (*Dulau.*)

Paraguay.—Mapa de la República del ——, construido y dibujado por Carlos Beyer, Ingeniero Civil. Sobre Mapas y Croquis de Johnston, Rengger, du Gratz, Wisner de Morgenstern, Page, Dr. Toeppen y segun observaciones propias. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Publicado por Ernst Nolte. Buenos Aires, 1886. Price 18*s.* (*Dulau.*)

There are so few published maps of the Republic of Paraguay, that even a map like that under consideration will be welcomed by all interested in that part of the world. The compiler has used all the available material at his command, but the result is not very satisfactory, as with the exception of the southern portion there is very little more laid down than has appeared in much older maps, and the price asked for this rough production (18*s.*) is prohibitive.

AUSTRALASIA.

Bancka.—Karte der Alluvial-Bildungen in ——. Von Dr. Th. Posewitz. Scale 1:1,400,000 or 19·1 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 10. Justus Perthes, Gotha. (*Dulau.*)

Saleijer.—Originalkarte der Insel —— im Ostindischen Archipel. Aufgenommen u. gezeichnet von H. E. D. Engelhard. Scale 1:150,000 or 2·04 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Tafel 9. Justus Perthes, Gotha. (*Dulau.*)

Tarawera Volcano.—Map of the Country around ——. Eruption of 10th June, 1886. Scale 1:250,000 or 3·4 geographical miles to an inch. Surveyor-General's Office, Wellington, N.Z.

This map, which has been issued by the Surveyor-General's Department, will be found useful for reference in connection with the eruption of June 10th, 1886. It contains an inset map, on a reduced scale, of North Island, N.Z., and a view of Mt. Tarawera before the eruption.

ATLASES.

Berghaus' Physikalischer Atlas (Begründet 1836 von Heinrich Berghaus). 75 Karten in sieben Abteilungen, enthaltend mehrere hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, Dr. Karl v. Zettel, herausgegeben von Prof. Dr. Hermann Berghaus. Dritte Lieferung. Inhalt: Nr. 16 Land- und Wasserteilung. Nr. 28, Januar-Isothermen. Nr. 52, Verbreitung der Säugetiere I. Gotha, Justus Perthes, 1886. 3*s.* each part. (*Dulau.*)

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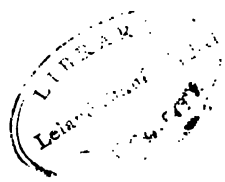

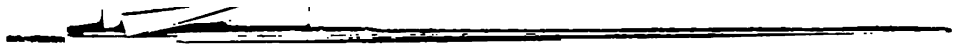

Edw.d Weller, lith.; Red Lion Square.

Leland Stanford, Jr.
UNIVERSITY

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

The Congo Free State.

By Colonel Sir FRANCIS DE WINTON, R.A., K.C.M.G.

(Read at the Evening Meeting, June 7th, 1886.)

Map, p. 680.

IN presenting myself before you this evening, I may be permitted a few words of explanation as to the reasons why I am here to-night to read a paper on the "New Free State of the Congo." The rise and origin of this State is now well known, and its history has been written by my friend Mr. Stanley. By that history you learn of the perseverance and high-minded philanthropy of his Majesty the King of the Belgians, and of the energy and boundless resource of Mr. Stanley. If I allude to these two points, it is because in my opinion they are the two most striking points of that book, and I shall never cease to admire the faith of the King and the courage of his lieutenant, a faith that never tired, a courage that never was daunted. My work began when that book ends, but it was very different from the work of my predecessor. His, as that history tells us, was the exploration, establishment of stations, and acquisition of territory; mine was to bring that labour under administrative control and weld it into a useful mass. To do this I had naturally to travel, to learn the manners and customs of the natives, to encourage exploration of all parts of our territory, to promote commerce, and so forth, and in now proposing to give you the result of my experiences I beg your kind indulgence, for I am not an explorer, and with the exception of the Kasai I cannot travel over any new ground; neither, to my sorrow, do I possess the necessary attainments which would enable me to throw some light on the many problems of science which are to be ascertained in this interesting region.

The recent explorations of the Upper Congo are so important that they form a fitting commencement of any paper which attempts to describe that region, or which tries to give an account of the progress that is taking place in the development of the country.

Many of these explorations happened during the period when I had the honour to administer the affairs of this State, and I should be wanting in my duty, in that respect, which we all feel for those who risk their lives in endeavours to conquer the unknown and so add to our geographical knowledge, to those who by their intrepidity and perseverance have conducted these explorations and brought them to a successful issue, if I did not give them the foremost place.

The most important of these explorations—I use the word important because of the difficulties which had to be encountered at the outset, and because of its general completeness—is that of Lieut. Wissmann and his companions, Dr. Wolff, Lieuts. Möeller and François, and Messrs. Schneider and Buchner. These five Germans left the coast nearly three years ago, and marching to the east in two columns through a very difficult country for about 800 miles, effected a junction in about 22° E. long. and 6° S. lat. in what is known as the country of the Baluba tribe. This tribe had been visited on a former occasion by Lieut. Wissmann in company with that lamented and enterprising traveller Dr. Pogge, and friendly relations had then been established between them.

They received a warm welcome, and shortly after their arrival a site was chosen and buildings were begun. The king or head chief of the Baluba moved his village to their neighbourhood, cattle were purchased, seeds planted, and in six months the station was in a thriving and prosperous condition.

But this was only the commencement of the real work of this expedition. Its organisation and equipment had been furnished by the King of the Belgians, and its true object was the exploration of the river Kasai, whose many tributaries had been crossed from time to time by explorers and travellers, of whom Dr. Livingstone was the pioneer, traversing the continent from the Zambesi basin on the east coast to the Portuguese possessions on the west coast. From the number and size of these tributaries it was naturally conjectured that they formed the head waters of some mighty stream; but the true direction of its course, the nature of its bed, its capacity for navigation, the disposition of its inhabitants, the point of its junction with the Congo, &c., all were unknown, and these were the problems which Lieut. Wissmann and his companions undertook to solve. Let us for a few minutes follow their adventurous exploit.

The station completed, one of their number, Mr. Buchner, was left in charge. A spot was selected on the banks of the Lulua, one of the tributaries of the Kasai, trees of suitable wood were felled, and the work of building a fleet of canoes was rapidly pushed forward. I should mention that it had been previously arranged by his Majesty that Lieut. Wissmann should engage a number of Baluba natives to accompany him on his journey down the Kasai, with the view of introducing them to the Congo, and so persuade them to enlist as police or militia in the service

of the new State. Such was Lieut. Wissmann's influence over these people, that the chief Kalemba, and his successor Chingenga, with about 200 of their followers, agreed to accompany him, and they accordingly embarked about April 1885 in twenty large roughly-built canoes on the waters of the Lulua. For the first few days, navigation was difficult on account of rapids, several accidents happened and two natives were drowned. On the 6th day they reached the junction of the Lulua and Luebo. This junction forms the extreme end, towards the N.W. of the Baluba kingdom, the Lulua being the dividing line between the Baluba and Bakuba; the Luebo separating the Baluba from the Bashilela.

From this point navigation became easier, no more rapids were encountered, and the Lulua soon after joined the Kasai, which in its turn received the waters of the Sankuru, and thus reinforced, flowed on a grand river with a W.N.W. course, and the little fleet of canoes floating on its waters advanced each day towards the goal of their hopes and desires, the Congo.

They were not without adventures. At one place they were treacherously attacked by natives, while some of their canoes were entangled in one of the many narrow channels of that part of the river; and in another place they killed seven elephants in about as many minutes. After about forty-two days they sighted the Congo, which at first they took to be a large lake, for the continued course of the Kasai W.N.W. puzzled them. All previous ideas giving it a more northerly direction.

On approaching the junction, the flag of the station of Kwa-mouth was sighted, and then they knew that the object of their journey was gained, that the goal had been won. Three days after, they descended the Congo, and arrived at the station of Leopoldville, thus accomplishing a most adventurous voyage with complete success.

For some months I had been expecting news of Lieut. Wissmann, and had despatched certain goods, sent from Europe for the use of his party, to the Equator station on the Upper Congo, and it was my intention to have been at Leopoldville to meet him on his arrival at Stanley Pool. I was however detained on the Lower Congo longer than I had anticipated, and did not leave Vivi till the 29th July. On my way up country, I learned of the arrival of the expedition, and at Lutete I met Dr. Wolff, who had been sent by Lieut. Wissmann to meet me, and to see about arrangements for taking the Baluba people back to their country.

I reached Leopoldville on the 17th of August, and having decided to use the *Stanley*, a new stern-wheel steamer, which had recently been dragged overland to the waters of the Upper Congo, at great trouble and expense, to transport these people to their homes, the work of putting her together and getting everything ready was pushed forward as rapidly as possible.

On the 5th of October, the *Stanley* left Leopoldville with 238 people on board, and about 18 tons of cargo. She was heavily laden, and it was her first voyage, so I accompanied the expedition; and in thirty-five days after leaving Stanley Pool we reached the junction of the Lulua and Luebo, the point before alluded to. Here everything was put on shore, and the *Stanley* remained four days in order to assist Dr. Wolff and his party to clear sufficient space for a new station. We left on the 11th of November, and on the ninth day reached Leopoldville, taking 137 hours to steam up the river, and 56 hours to come down. I forgot to mention that a small steamer, the *En Avant*, accompanied this expedition. She was left at Luluaburg, in order to enable Dr. Wolff to continue explorations on the Kasai and the Sankuru. Lieut. Wissmann, to my great regret, did not form one of the party. At the time of our departure he was suffering from a severe attack of asthma, and the medical men advised an immediate change to a more northern climate.

I am happy to state that he returned before I left the coast, and by this time is again among the Balubas and continuing his useful work.

If I do not to-night say as much as I might about this noble river, it is because Lieut. Wissmann and Dr. Wolff are preparing an exhaustive report of all their journey and discoveries, with a full account of everything connected with that interesting region, and it would not be right for me to anticipate their account.

I can, however, tell you that the Kasai is a river presenting no serious difficulties as regards navigation; that it offers with its affluents a large field for commerce, and that its discovery opens up a vast territory to the merchant, the missionary, and the explorer.

Its general features may be briefly described as follows. The average width, after junction with the Sankuru, is about three-quarters of a mile, the breadth of valley through which it passes varies from two to five miles. Hills on either side, rising very gently, are seldom more than 100 feet in height. The average velocity of current is about three miles an hour. In many places navigation is somewhat impeded by sand-banks, but with a little care, by avoiding short cuts, and following the strong water, these portions can be easily navigated. The *Stanley* drew about 2 feet 3½ inches, and the *En Avant* about 2 feet 6 inches.

For the first one hundred miles after leaving Luluaburg the banks on either side are covered with dense forest—forest primeval, judging from the huge trees springing from out of the dense mass of foliage which fringe the river margin—trees of every shape and form, with endless variety of leaf and beauty of colour.

This is the home of the indiarubber-plant, the orchilla weed, and the different kinds of gum-bearing trees—also of the bamboo palm, and creepers almost without number, which some day will be found to have a value in the markets of the world. Gradually as we descend the

stream the forest disappears, the valley widens, grassy glades become more frequent, till at length the country becomes an almost open prairie or savannah, dotted here and there with clumps of trees, and the river twists and turns among the low sandy islands, which must constantly change, as they have no vegetation on them except low grass and mimosa shrubs. Here and there are groups of palms, but the scenery is generally the same, and somewhat monotonous.

This section of the river does not seem to be thickly populated. A few huts are dotted on the islands, apparently used for fishing purposes, but on our return we found that the larger villages were placed inland. The last seventy miles before reaching the junction of the Quango navigation is better, the river narrows, and the two banks, especially the left, are thickly populated.

As regards the natives of this region, I saw but little difference between them and the natives of the Congo, except that they were about one degree lower in the scale of civilisation. Judging from their ornaments—they had no beads or other commercial goods—they had never traded with the coast. Many had never seen a white man before. None had ever seen a steamer. To whistle or blow-off steam was enough to stampede a whole village, and what made the wheel go round was a source of endless comment. At last it was decided by one very wise old man that the boilers contained a sort of devil mundella, or white man, who was kept inside and fed with wood and fire; that this devil was very strong, and it was he who worked and made the wheel go round. It was not such a bad idea after all.

With one exception all the natives we met were friendly — this exception was the tribe of Basongamino, the same who so treacherously attacked Lieut. Wissmann on his journey down the Kasai. They occupy both banks for about forty miles in about long. E. 21°, and are a troublesome race, always quarrelling with their neighbours, and robbing canoes as they pass up and down the river; in fact, they had completely stopped the navigation of the Kasai as far as native trade was concerned.

With the friendly disposed natives we soon established good relations; they were very anxious for trade, and were ready to barter their arms, which consisted of spears, knives, and bows and arrows, for our goods. One of their customs in trading is to break a small twig, or piece of wood, as the concluding ceremony of a bargain, otherwise it is not complete, and their respective goods can be reclaimed. One afternoon, when we were camped on the Loange river, my servant came rushing in to tell me he had bought a good sized goat for an old 2-lb. meat tin. He was in such a hurry to communicate the news that he forgot to break the customary twig over the transaction. The natives, on the other hand, who had sold the goat, were so delighted at their bargain that they rushed off into the bush, the transaction not being complete, lest they should

have to give up the precious treasure—the old meat tin—they had obtained.

We were frequently urged to stay at different places in order to allow the natives to bring their ivory for trade; but time is a stern arbiter, and there was so much work for the *Stanley*, that I was reluctantly obliged to push on. From what I ascertained I am of opinion that the basin of the Kasai will be found to contain large quantities of ivory. It also, I should judge, from the numerous tracks seen at our halting-places, abounds in game, especially elephant and buffalo, while the river swarms with hippopotamus. Of bird life I saw but little, except grey parrots; but one night we camped near a colony of bats, who, as the sun went down, came out in amazing numbers. They were about the size of a pigeon and lived in trees. For the entomologist and botanist the forest region of the Kasai offers a brilliant field for research. At Luluaburg, the quantity and beauty of the different varieties of butterflies would gladden the heart of a collector, though he might object to a small kind of bee, as we did, which being disturbed by our camp on shore, in revenge took possession of the *Stanley*, and made their presence felt.

Next in importance to those of Lieut. Wissmann and his brave comrades, are the discoveries and explorations made by Mr. Grenfell, of the Baptist Mission. During the past two years, in the little missionary steamer the *Peace*, he has ascended and explored the Mobangi, Juapa, Loika, and Maringa rivers, besides other smaller tributaries of the Congo, thus extending our knowledge in various directions for a distance of at least 1500 miles. As an account of these discoveries is about to be published in the 'Proceedings' of this Society, I shall only allude to them very briefly. The most important of these rivers is the Mobangi. Mr. Grenfell ascended it as far as 4° 30′ N. latitude. He found it a noble river, resembling in many respects the Kasai. As he proceeded northward he perceived certain differences in the natives as compared with those he was accustomed to on the Congo. These latter are known by the generic name of Bantu, while the Mobangi native appeared to have characteristics similar to the natives of the Cameroons and the Gold Coast, which properly belong to the Fan tribe. As these rivers are explored, and the border lands of these two great nations, the Bantu and Fan, become better known, an interesting study will be afforded to the ethnologist.

A little beyond 4° N. lat., Mr. Grenfell had to return, but not before he had ascertained that the course of the Mobangi had a decided tendency to the eastward.

Now the size and the volume of water of this magnificent tributary of the Congo prove it to be the offspring of many waters coming from afar, whilst its general direction points out that it may have its origin in the Niam-Niam and Mangbattu countries, in fact, that it is the Makua or Welle of Schweinfurth. The sources of rivers are, as you all

know, the sources of many surprises, and I submit this opinion with much deference. It is, however, always satisfactory when the disjointed discoveries of a great river are connected by a complete survey, and the unknown becomes the known. Let us hope this will soon be the case with the Mobangi, and whether it proves to be the Welle, or whether it has its origin in the territory lying to the north of the Congo (perhaps in the Adamawa country, or perhaps it has a connection with the mysterious lake Liba or Tiba), either problem will be most interesting from a geographical point of view, for if the former, it will complete the work begun by Schweinfurth, if the latter, it will add to our knowledge a portion of Africa hitherto unexplored.

Let us also hope that Mr. Grenfell may be allowed to finish this work, for in addition to his merits as an explorer, he is an earnest, large-minded missionary, and has gained for himself the reputation of being a most painstaking and accurate observer.

A German expedition under the auspices of the Berlin Geographical Society, composed of Lieuts. Schmidt, Kauntz, and Dr. Buchner, reached the Congo in the autumn of 1884. Since their arrival they have been at work in the country between Stanley Pool, San Salvador, and the Kuango. Lieut. Schmidt unhappily succumbed to the effects of the climate, and was buried at San Salvador. Dr. Buchner striking the Kuango near *Matundo*, completed the unexplored portion of that river by following it down to its junction with the Kasai, and then crossing over the height of land arrived at our station of Kimpoko at the upper end of Stanley Pool. At one place his little party were threatened by a large and hostile demonstration, but when the natives learned that he was going to Bula Matari their opposition ceased, and he was allowed to pass on without further molestation. I mention this as a proof of the influence exercised by Mr. Stanley among these neighbouring tribes, who, though they have never seen him, acknowledge and respect his name.

Lieut. Kauntz, since my return to Europe, has also further added to our knowledge of that region.

In addition to these efforts, mention should be made of the work done in the Ogowé basin, and in the country north of that river by the French, and I have no doubt Mr. de Brazza will shortly furnish information on this subject.

As a fitting supplement to this short review of the work done in the past, I propose to tell you in a few words what is now being done in the present year.

The *Stanley* left Leopoldville on the 28th December last year, and reached Stanley Falls after a voyage of forty-two days. The object of this voyage was to replenish our magazines on the Upper Congo, to relieve some of the personnel, to punish some tribes who had stopped the navigation of the river about half-way between Bangala and Stanley Falls, and

to make an inquiry into the general prospects of the ivory trade. One of her passengers was Dr. Oscar Lenz, well known for his successful travels in different parts of Africa. His intention was to engage if possible from Tippoo Tip, an Arab escort, with which he proposed to penetrate into the interior, and I cannot do better than read some extracts from a letter I have lately received from him, which will give you an idea of his probable intentions. He impressed me as being a man of great tenacity of purpose, and with a thorough knowledge of African travel, and if he succeeds in his undertaking he will, I am convinced, contribute some valuable knowledge of that portion of Africa he proposes to visit. I am sure you will all join with me in wishing him every success in his arduous undertaking.

"STATION STANLEY FALLS,
February 20th, 1886.

"DEAR SIR,—I have the honour to inform you that the steamer *Stanley* arrived happily, after a trip of forty-eight days, at the station 'Stanley Falls' on the 14th February. At Equator Station Mr. Deane took about fifteen Haussas on board; at Iboko (Bangala Station) he engaged ten Haussas and forty-three Bangala men, so that we have now nearly 150 men. At the Falls Station we found Mr. Wester very ill. Lieut. Gleerup left the station last December, going with the Arabs to Nyangwe, and from there to Zanzibar. Mr. Harris's time is over. He is going home, and so there is now only Mr. Deane and Mr. Eytken. I was very glad to hear that Tippo Tip is at Singitini (the Zanzibar name of the falls). He has kindly promised me all his assistance. I heard from him the following news:—About one year ago he sent a small expedition in a northerly direction from here. His people were attacked by the Wabai tribe, who then came down to the falls and attacked the Arabs and even the station. Afterwards he sent a big expedition of 500 to 600 to the north, commanded by Ali ben Muhamed. From this expedition he received no news for ten months. He has therefore sent, a few days ago, some people to look after them. He has also received a letter from the Sultan of Zanzibar with the order to come to him, so Tippo Tip will leave Singitini in twenty to thirty days to go to Zanzibar. He told me that he would give me, with the greatest pleasure, 200 to 300 men as soon as Ali comes back from his expedition. On this I told him that I would stop about a month here. If in this time Ali does not come back I would go to Nyangwe, and from there to Ruanda and the lake Muta-Nzige, where Tippo Tip has a station, and he promised me seriously that he would give me people to bring me to that lake. The route is quite open. From this place I can, perhaps, reach the Albert Nyanza, and there I can get news of Mr. Junker, Dr. Schnitzler (Emin Bey), and Signor Casati, so I will wait here a few weeks, and if in this time Ali does not come back, or if he brings bad news from the north, I shall go to Nyangwe.—OSCAR LENZ."

I have also heard, since my return, that Lieut. Wissmann had persuaded Mr. Grenfell to take him to Luluaburg in the *Peace*. We shall therefore soon have the benefit of Mr. Grenfell's observations to determine with accuracy the course of the Kasai.

The *Stanley* has returned from the Upper Congo and is at this moment also navigating the waters of the Kasai. Her object is to take up fresh stores for Lieut. Wissmann's expedition, to investigate the ivory trade, and to bring back some Balubas for employment in the service of the State. This voyage being completed, Lieut. Wissmann will either proceed up the Mobangi or again visit the Upper Congo stations.

From these outlines you will see that the work of exploration is being steadily prosecuted and encouraged, as far as compatible with the necessary service of the new State. Besides the *Stanley*, there are two other steamers belonging to the Upper Congo, and also the *Peace*, and the *Henry Reid*. I have further received the commands of His Majesty the King of the Belgians to commence arrangements in order that the State may in the future build her own steamers on the Upper Congo out of the native woods, and these arrangements have been so far successful, that by this time next year, we hope to have a steamer of about 100 tons, drawing 18 inches of water, and with a speed of ten knots, in a fair way towards completion.

I cannot quit this portion of my paper without alluding to what appears to me the real value and importance of these discoveries.

From 17° E. to 26° E. long., and from 4° N. to 7° S. lat., is a vast rectangular tableland 475,000 square miles in area, only a few hundred feet in height and having a gradual slope from the south-east to the north-west. Throughout this huge tract runs the mighty Congo, with its horse-shoe shaped course, and the whole is intersected by numerous navigable tributaries. It is Mr. Grenfell's opinion, and I coincide with him, that when this region is fully explored, it will be found that there is scarcely a hundred miles of its area which is not approachable by a water-way. Think for a moment how important this fact becomes when applied to the questions of civilisation and commerce. Consider the possibilities which lie hidden in the future of such a country.

Nature has made in this territory an almost unique system of natural canals, the heavens furnish them with ample supplies of water, and it only needs the perseverance and hand of man to connect this magnificent area with the ocean and so develop its ample resources.

For many years, indeed until quite recently, this country was a *terra incognita*. Vague rumours existed of dwarfs, of a race with tails, of huge mountains, while various other improbabilities were in circulation. The sunshine of knowledge has caused these mists of imagination to disappear, and by the process commonly called familiarity, we have learned to treat the dangers of African exploration with a certain

contempt; but we are not assembled here this evening to discuss dangers or impossibilities. What we desire to know, what we wish to understand, is this—How can we utilise for the benefit of mankind, white and black, this huge mass of the earth's surface? And this brings me to the second portion of my paper, viz. the consideration of the people who inhabit it.

As a general principle, it may be stated, without fear of contradiction, that whatever natural advantages a country may possess, the rest of the world cannot peaceably enjoy them if the inhabitants of that country are a strong, united, and warlike race, and who object to intercourse with the outside world. Therefore, while I have endeavoured to place before you the general outlines, as far as we know them, and the physical advantages of the basin of the Congo, any arguments I may have used in its favour would be useless unless I was further able to show you that the races who occupy it are not calculated, by the nature of circumstances, to offer the least resistance to its occupation by the dual forces of civilisation and commerce.

My experience then of these people may be briefly stated. What I have seen of them I like, and after two years spent in their midst, during which I was forced to study their habits, manners, laws and customs, I see no cause for apprehension that the security of the new State will ever be threatened by its black subjects.

My reasons for this opinion are twofold. First, the character of the people; second, their tribal formation. If asked to define their general character, I should reply that I considered them a negative race. They have none of what we call the higher qualities or virtues. They possess neither gratitude, affection, nor courage. Nor did I find among them what may be termed the vicious kind of vices. They are not naturally cruel, at least, I never saw it; they are not as a rule treacherous; if punished justly they bear no malice. They will lie too, and steal from the white man, and like all black and coloured races, they are cunning and suspicious. When, however, you know them, and are on your guard, it is your own fault if you are taken in, and as you gain their confidence, suspicion is easily removed.

During the two years I was on the Congo, I never experienced any trouble. To govern them they must respect you. My predecessor Mr. Stanley was respected, and I succeeded to the heritage. If a native does not fear you, he at once jumps to the opposite conclusion that you fear him, and then trouble arises. I continued Mr. Stanley's policy, and while I endeavoured to be respected, I on my part respected their manners and customs. If punishment was necessary, I punished as far as possible in conformity with their own laws. In thus ruling them, though you cannot obtain their affection or gratitude, for they do not possess such qualities, you obtain their confidence and respect, and that once gained there is as little difficulty in governing a million of such people as in governing a thousand.

Their chief characteristic is their love for commerce; they are born traders. The women do all the hard work and the agricultural labour, while the men look after the children and do what sewing is required. Thus the labour of the two sexes is almost reversed, yet in spite of this the women retain some of the well-known attributes of their sex. The last time I was passing by the big market of Marza Nkenge, I was resting on one of my boxes while the caravan were making their purchases, when I saw a black belle look a rival from another village well up and down, and then resume her avocations with a satisfied air, as much as to say "Your pocket-handkerchief isn't as good as mine, and oh, what bad beads you have on"; these are the two principal articles of clothing in those parts, and I could not help smiling as the thought passed through my mind, that the world is the world all the world over. I could tell you much more about these people, but it would take up your time. The best account given of their manners and customs will be found in a book called 'Angola and the River Congo,' by Monteiro.

The second reason—their tribal formation—demands only a short explanation. You will easily understand that a country made up of small communities, where a few villages constitute a kingdom, where autonomy—a word much used and abused just now—is the law of the land, where every one is weak, and no one is strong, where there is no unity, no strong hand by which nations are made and kingdoms created; you can well understand that a settled form of government on European principles will meet with no great difficulties from a native population, however large, living under the above conditions. I think this fact and the native love for trade are the two most important factors in the future of the new State. The one guarantees security, and the other invites commerce, and I do not believe there exists in any part of the uncivilised world, at least I have not heard of it, a territory so thickly populated offering similar advantages in its population as the basin of the Congo. Before dismissing the native questions and discussing the commerce of this region, I would speak for a few moments on what may be called the slavery question—a question which has ever excited a deep and natural interest in Great Britain, and a question which should not be avoided in any paper attempting a description of this country.

This question may be divided under two headings:—

1. The domestic slavery of the country.

2. The slavery which is invariably connected with the presence of Arabs in the interior, and the ivory trade.

As regards the first, it is so interwoven in the institutions of the country, that it would take generations to root it out; and though I have alluded to it as domestic slavery, I should more properly have called it domestic service. The natives of the Congo are so well aware of the value of property, that slaves are often better treated than the

members of the family. They carry on most of the commerce of their masters, often marry their daughters, and frequently become rich and powerful. Take for example the chief of Kintamo, Ngaliema. Originally a slave of Nchubila of Kinshassa, he is now the wealthiest ivory trader at Stanley Pool. It was this chief who threatened to stop Mr. Stanley when he was advancing to create the station of Leopoldville, and whose collapse is so graphically described in Mr. Stanley's latest work. Now he is a warm ally, and not long ago, when two of his slaves ran away, taking with them some valuable ivory, he applied to the chief of Leopoldville for assistance. This was given. The runaways were captured, and the ivory recovered and restored. Ngaliema was perfectly satisfied that they should be punished by white man's law; consequently, instead of having a head or an arm cut off, they were given three months' hard labour on the station works. Sacrifices still take place on the death of a great chief, but not in the enormous numbers one hears of on the Gold Coast and in that part of Africa.

The story of Ngaliema is a proof that better influences can be brought to bear on the native mind, and that the domestic slavery of the Congo basin is free from those revolting cruelties, that utter disregard of human life, which prevails in the ivory and slave countries of the central and eastern portion of Equatorial Africa.

To understand the real bearings of this, the second form of slavery, it will be necessary to consider for a few moments what are the principal causes which have created and fostered this nefarious and evil traffic. The principal cause is ivory. To obtain this article, the Arab traders organise and fit out large bands of armed men, generally runaway slaves from Zanzibar, or men who have been obliged to leave the coast and take refuge in the interior. A sufficient number of followers being collected, arms, ammunition, and goods are purchased, and the whole is transported to some central position, where a zeriba or head-quarters is formed. As soon as this position is securely established, bands are sent into the neighbouring countries, which they devastate, burn, and pillage, and the unfortunate inhabitants are taken as slaves, to carry the plundered ivory in large caravans to the coast. Here they and the ivory are both sold, and the Arabs realise a large profit on the double sale. Without the ivory, slaves alone would not pay the expenses which have to be incurred in the outfit, and we may therefore reasonably assume that if the ivory were taken out of the country by the legitimate operations of commerce, the slave trade, which is part and parcel of the present system, would cease to exist. If there was no ivory there would be no slave trade, eastward to the coast or northward to the Soudan. Now here is true work for the philanthropist. Let him assist the new State in developing its resources, let him help in the construction of some sure and certain means of transport from the navigable waters of the Lower Congo to Stanley Pool, and he will strike a deadly blow at a

traffic, the horrible details of which have often filled his heart with a deep pity for the poor unfortunate victims of the cruel system under which it is conducted.

As the well-being of every country or kingdom depends upon the ordered harmony of all its parts, so the future of the new Free State of the Congo must in a measure depend upon the commercial products it is able to offer to the markets of the world. To possess such products is to complete the ordered harmony to which its peaceful trading population and its great natural advantages both contribute. Neither are of use without the other two. You may have large commercial products combined with great natural advantages, but they are useless with a hostile population against you; then products and a peaceful population are of little value if physical conditions do not assist you; and you attempt to develop a most peaceful country with fine natural advantages in vain, if it does not possess products that have a value in the markets of the world.

The next question therefore resolves itself into this, Will the products of this country be sufficient in quantity and value to give a profitable return when disposed of in the European markets?

Let us see what are these products.

In his latest work, 'On the Congo, and the Founding of its Free State,' Mr. Stanley gives an exhaustive analysis as to the probable number of the inhabitants of the Congo basin, and the nature and variety of the products belonging to that region. Those who take an interest in the commerce of the Congo will find facts and figures in the chapter headed "The kernel of the argument" well worth an attentive perusal. It is not my intention to go into details, I should only weary you if I did, but my testimony to certain general facts is a necessary supplement to this section of my paper, and I propose to take a brief prospective glance at what the future commerce of this region may become.

You are well aware that ivory is the most valuable product of this land. That it exists in great quantities in the new Free State we have abundant proof; but as one fact is worth a bushel of general statements, I will give you a fact.

Encouraged by the State, two commercial houses, one Dutch and the other French, sent agents up the country last year, with the object of establishing factories on Stanley Pool, thus enabling them to deal direct with the ivory traders of the Upper Congo. In one day one of these traders had 386 tusks offered to him for sale. Now 386 tusks at an average of 50 lbs. each, equal nearly five tons of ivory, which at 50*l.* the cwt. represents a value of about 5000*l.* I am not going to tell you what the profit would be on such a transaction; it is so great that you would all start off to the Congo to become ivory traders, but to me such a fact is an evidence of a big trade in the future. There are two other points in this episode, which to those who have been in Africa and have some know-

ledge of the ivory trade, are very suggestive. They are these—that if the natives bring in the above-mentioned amount for trade in one day, they must have at least 20 tons in reserve—that is the first point.

Then if, in the small trade that has hitherto been carried on in the neighbourhood of Stanley Pool we find these large depôts of ivory collected, how much more will that trade increase when the country is opened up and we are able to transport goods in sufficient quantities to meet trade requirements. That is the other point, and I think you will agree with me that my fact is an important one. But ivory will soon be exhausted many say. Granted; but consider the vast extent of the Congo basin; that it is untouched; that much of this ivory has been collecting for years, and you may believe me when I tell you that it will take years even partially to clear the country of its dead ivory, and then you have the living ivory to fall back upon.

Thus the ivory may pay what may be termed first expenses, and in the meantime another valuable industry—indiarubber—will be rapidly developing. As you all know, indiarubber is one of the largest products of the great sister river to the Congo, the Amazons. That each year increases our knowledge of its manufacture and the uses to which it can be applied; so that the supply does not equal the demand. It is also known that each year increases the difficulties of collecting this gum on the Amazons. Here, then, is another field for commercial enterprise, and I will give you a fact which came under my personal observation with reference to this article.

I paid a visit to the Kuilu river some four years after its occupation by the then International Association. It is only navigable for small steamers for about 40 miles. At the head of this navigation, numerous small factories have been erected solely for the indiarubber trade. On the day I visited them there were not less than from 700 to 1000 natives all bringing in indiarubber. Now, if on a small river like the Kuilu, with its limited navigation, such a trade springs up in a few years, what will be the trade of the many hundreds of miles of the navigable waters of the Congo?

Besides ivory and indiarubber, there are the other products mentioned by Mr. Stanley in the chapter I have above quoted; and if I do not allude to them, it is not because I do not believe in them, but because I cannot give you any certain practical information as to their probable future value.

As to minerals, I cannot speak with any certainty about them. It is thought that gold exists in the interior, but I am somewhat sceptical. Had there been any surface gold, the keen-eyed native, with his love for metals, would not have left it till now undiscovered. Copper is found of a good quality; but copper mining, as many have found, is a precarious venture. With much anxious care I scanned the cut banks of the Kasai as we passed them by for traces of coal, but none were there.

No, I think it is far better to trust to and develop the natural riches of the soil, and then if there are any treasures buried beneath the surface they will become known in the fulness of time.

I have not yet touched upon the present position and prospects of the Government of the New Free State. If I were to enter into details, they would be so full of my personal work that it could not be pleasing to you, and it would not be agreeable to myself.

This much I can assure you, that the New Free State of the Congo is starting on a safe and useful foundation. That law, order, and system are being rapidly introduced into the working machinery of its government; that it has received the magnificent endowment of 40,000*l.* a year from the King of the Belgians, and that it offers ample security to all who seek a livelihood within its territory.

Perhaps I should add a few words about the climate. Well, the climate of the Congo has been made the subject of foolish praise, and lavish abuse. There is as little need for the one as for the other. It is simply a tropical climate, with well-known marked types of fever common to such latitudes. There are some persons whose constitutions are more liable to fevers than others, these I would not advise a longer stay on the Congo than two years. Prudence and care are as essential to the general health as they are found to be all over the world. I had but one attack of fever, and that was caused by my own imprudence.

My belief is, that as the conditions of life improve out there—and they will improve as the country develops—it will be found that the Congo is as healthy as many parts of India and other tropical climates where Europeans are living, and have lived for many years with impunity.

As a natural law it may be assumed that all geographical discoveries help each one the other, as they increase our knowledge of the surface of the earth. Discoveries are the stepping stones for the introduction of natural sciences, they are the advanced guards of civilisation and commerce. Let us apply this law to the Congo river basin and the New Free State that has been founded to develop it. As a field of labour for the missionary and philanthropist these lands have no equal in the advantages they afford.

To the sportsman and naturalist they are overflowing with the fulness of animal, bird, insect and plant life. To those who follow scientific explorations what opportunities are given for travel and discovery!

And lastly, its commercial capabilities, and these have a twofold aspect.

The trade that is created, and the impetus given to the manufacture of the requirements of that trade. Think for a moment of the misery, hunger, want, and evil passions that follow the steps of the great mass of unemployed labour. Well, here at least is one door, one new market for European produce opened.

Shall we leave this vast territory as dead as we found it? Are the advantages which Nature has given to this region,

> "Nature, a mother kind alike to all,
> Still grants her bliss at labour's earnest call—"

Are these advantages to remain unused, uncared for? Surely the answer is "No." Much has been done by the large-minded philanthropy and munificence of one man, His Majesty the King of the Belgians. He has laid the foundation of a new State, let the world now join in reaping the advantages of his noble work.

Before the paper,

The CHAIRMAN (Sir Rutherford Alcock), after expressing his regret that Lord Aberdare was prevented by a family bereavement from being present at this the first meeting after his election as President, said that in other respects he was very glad to take part in the meeting, because they were about to hear a paper read by a very distinguished traveller and administrator, Sir Francis de Winton, who for more than two years was at the head of the Congo Free State as the representative of the King of the Belgians. It was always most valuable to get direct evidence from those who had been on the spot and could speak from personal observation, but when, in addition, they could speak with authority, as Sir Francis could, he was quite sure that the Society would listen with great interest to whatever was to be said about the capabilities of the territory in the basin of the Congo, a territory larger than half-a-dozen Belgiums. The meeting had the benefit also of the presence of one of the most distinguished African explorers, Mr. Stanley.

After the paper,

The CHAIRMAN said the paper was a most valuable and interesting one, relating as it did to what was well called by Stanley, years ago, the Dark Continent. Not many years ago the region was a *terra incognita*, but nothing more marvellous had happened in the nineteenth century than the opening up of Central Africa to the efforts of missionaries, merchants, and politicians. Any information that could be obtained from personal observation was of singular interest, because the problem now to be solved was not what Africa is, what it can produce, what is its climate, what is the nature of its inhabitants, but how it can be turned to account in the interests of religion, philanthropy, and commerce. In order to carry on commerce, not only must the country be fertile and the population willing to traffic (both which conditions were fulfilled in the basin of the Congo), but there must be facilities of transport, means of communication with the ocean, and he believed that Mr. Stanley had gone a long way to solve that difficulty. Fourteen hundred miles of free navigation was a most tempting lure to any enterprising country, but access to that navigation must first be obtained. According to Mr. Stanley's account there happened to be some forty leaps and bounds down to the Atlantic coast which interposed before the still water of the Lower Congo could be reached, while on each side of the Equator there were four or five cataracts to be surmounted. The only way of overcoming those difficulties was by a railway, and unless commercial interests led to the formation of an iron road there, it would be vain to expect much trade on the 1400 miles of a grand river, even though the people were willing to traffic with Europeans. All present would be anxious to hear what Mr. Stanley, the most competent authority on the subject, had to say as to the progress that was being made towards conquering this initial difficulty.

Mr. H. M. Stanley said that he remembered when battling down the great river, amid the Sabbath silence of the island channels, indulging in speculation as to the uses that might be made of the magnificent waterway which daily unfolded itself. As mile after mile of land receded behind him, with majestic vegetation on either bank, and a series of channels between one side and the other, he was deeply struck with the prospects of such a river, provided there was some easy entrance into it, and when 500 miles had rolled past his anxiety rose to such a pitch that his prayer was, "Increase, good Lord, this mileage, otherwise the continent will be lost for ever." Mile after mile was passed, tributary after tributary was seen emptying its treasures of water silently into the depth of the Congo, till at last a thousand miles were counted, and by this time the river was certainly six times greater in volume than at Stanley Falls. From the distant north and south great tributaries rolled their waters into the stream, till at Stanley Pool it seemed as if they were about to have another world revealed to them. At times he could not help feeling that he was at the birthplace of a creation. At the western extremity of Stanley Pool the river contracted again, and he could see a line of vaporous clouds wreathing and purling above the place where it plunged down the terrace, and then he knew his prayer was answered as much as he could expect it to be. He remembered very well how, in 1872, Livingstone used to dilate upon the virtues that were lying dormant in vast Africa, and how he (Mr. Stanley) always replied to him with a sort of sceptical sneer, for at that time he did not believe in the virtues of Africa, he did not believe that any good could come out of Africa, and he told him so with that frankness which ignorance could always muster. Possibly, persons equally ignorant with himself, would have deemed his remarks unanswerable, but in the first leisure time he had after coming out of the Congo, and finding himself at Kabinda, he turned with eager curiosity to sketch the manifold lines of travel he had traced, and to draw the outline of the great river and the spacious lakes that he had navigated. When it was all down on paper what a revelation it was to him! It was neither more nor less than a corroboration of Livingstone's ideas. Down to then he had only been a student in Africa, but when he came to England in 1877–78 he felt inspired to be a teacher. The scales had fallen from his own eyes; why should he not teach the blind folk to see? Of course he could not be surprised that people were so slow to understand, since he had taken five years to realise the good there was in Africa; but it happened that just at that time, when he was wearied with giving lectures and writing a book, there was a student across the Channel deeply investigating the subject—a profound geographical student, King Leopold, who after a few days' conversation and counsel, gave him a commission and said, "Go back there and see what you can do. Develop Africa; let me see what it is, and report as early as you can, and then, perhaps, we will go a little further." He also advanced a modest sum of 20,000*l*. In two months he (Mr. Stanley) arrived at the Congo and began the work. From 1879 till the middle of 1884 he was engaged upon it. He built various stations, nuclei, as it were, of cities, provided people were enterprising enough to follow in his tracks. He reached a distance of 1400 miles from the sea, and then looking back it struck him that it was dangerous for one man to go on and do it all. In successive letters he implored to have some one to assist him before it was too late, for he was afraid that the edifice was being built up with rather untempered mortar, and that it might collapse. At that time there was a hermit lodging at the base of Mount Carmel, just the man that was wanted for the occasion, with that sort of mechanism which reconciled men to their duty, a born chief and leader. That man was Gordon, but just as it was expected that he would come, a letter was received saying that he was going to the Soudan, whence he never returned. In his place, however, there came another gentleman, Lieut.-Colonel de

Winton. Of course, as he had never seen Colonel de Winton he was very much inclined to study him on his arrival. He found that Colonel de Winton was remarkably bland and gentle, and soft-mannered in his speech, but with a good deal of the requisite firmness shielded by a sort of silky guile, which he quite showed during the very first days that he was on the Congo; so that if Gordon could not be sent no much better man than Colonel de Winton could occupy the position. After a few weeks engaged in initiating him into what had been done and what was to be done, he (Mr. Stanley) had to depart for Europe and enter upon another phase of the work, namely, to win the recognition of the European Powers for the consolidation of the State. Otherwise he would have simply been clearing the wilderness for another power to step in and destroy all that he had done. That work occupied a few months; there were some anxious intervals, but at last they succeeded, and fourteen European Powers subscribed through their plenipotentiaries to recognise the permanent existence of the Congo Free State. If Colonel de Winton would not regard it as a piece of cavil on his part he would like to make one or two remarks upon the paper. It must be understood that in that hall there had been frequent discussions, not always of a mild or conciliatory character, but what he was going to say would be conciliatory. Colonel de Winton made a very remarkable statement when he said that some one had praised the Congo climate. It was true that all who came back from the Congo looked remarkably healthy. If there was any young man present with an orange tint, or a rich, creamy complexion it might be taken for granted that he had just come from the Congo. If a person had a shade of severity on his face it was certain that it had been caused by his zealous efforts to polish the African natives; while if there was a shade of sadness on his countenance, it had doubtless arisen from the painful disappointment he felt, that while he had been contributing his best endeavours towards the unity of the scattered tribes, to carry out the Belgian motto "Union fait la force," his country was following the fantastic delusion of disunion. Colonel de Winton would also permit him to protest against one phrase that he had used when he said that the natives possessed neither gratitude, affection, nor courage. Through a magnanimous and tender feeling for the soul of a young cannibal boy, Colonel de Winton brought him to England, and he (Mr. Stanley) had an interview with him. He endeavoured to find out whether it was true that the tribes had neither courage, affection, nor gratitude. He asked him, "Is it true, boy, that your people have no affection?" "Oh, master," he replied, "who says that? That cannot be right. Why, even the animals love one another, and are we less? It is only fire and water that do not like one another." "But is it true that you have no courage?" "Well, master, when we meet white men they have got such fierce weapons that our people are killed before we can reach them, but against one another I think we fight very well." Then he was asked, "How can you prove to me that there is such a thing as gratitude in you?" "Well, master, we love gifts, and we love the giver, but we love the giver best, because the giver might give us something more to-morrow." That was only the answer of a little cannibal boy who probably seven years ago was indulging in a human chop. Lord Bacon said that he that goeth into a country without knowing the language, goeth to school and not to travel. Was any one who had been on the Congo such an accomplished linguist that he could at once say whether these people had gratitude, affection, and courage or not? Europeans out there conducted themselves like despotic chiefs. If His Imperial Majesty the Czar of Russia visited an English home, and received the best the house could afford, it might not be sufficient for him according to his own estimation, but when he went away he might give a snuffbox, or an order, and it would be accepted as a mutual interchange of goodwill; but if it was suspected that the Czar intended to kill his host, or to take away his liberty,

the pugnacious character of the Englishman would not allow him to feel much gratitude. So there had been no true benevolence in the gifts to the natives, and therefore, he did not think it could yet be said that the natives had neither affection, courage, nor gratitude. Colonel de Winton had wisely emphasised the fact that it was time something was done to connect the sea with the vast stretch of navigation on the Upper Congo, but it was not in the power of anybody outside the royal palace at Brussels to lay down a railway. There was the utmost readiness in England to contribute the full number of shares, but until the king's permission was obtained no one would dare to make a railway. No doubt the permission would be granted by-and-by, but so far it had not been obtained. Until the sanction was given it was premature to say a single word relative to the railway, except that it was possible of accomplishment. Without the railway the entire Congo State, vast though its area and inexhaustible its resources, was not worth a two-shilling piece, not worth even a passing thought.

The CHAIRMAN said that Mr. Stanley had given the assurance that there was no physical impossibility about laying a railway past the cataracts, and whenever it pleased His Majesty the King of the Belgians to make the necessary arrangements it was to be hoped that the enterprise of all Europe would be called into play in order to perfect the result of the efforts of so many bold and able men who had taken the preliminary steps for the exploration of Africa. Philanthropy and commerce must join hands in order to put down the slave traffic, and he hoped that before long the iron horse would be got to work, when an almost unlimited field would be opened for almost every kind of enterprise. He was sure the meeting would join with him in a vote of thanks to Sir Francis de Winton for his interesting paper, and to Mr. Stanley for the valuable information he had given them.

Exploration of the Tributaries of the Congo, between Leopoldville and Stanley Falls.

By Rev. GEORGE GRENFELL.

Map, p. 680.

BEING at the present moment on a journey, and not having the notes of my previous ones with me, it is not possible for me to write so fully as I might otherwise do. However, as I must not delay any longer to write something concerning the sketch maps I sent to the Society so long ago, I will at once take the opportunity which presents itself to send a short account of those affluents of the Middle Congo, which I have visited in the Baptist Missionary Society's steamer *Peace*.

The Kwa was the first of these affluents which the *Peace* ascended, and it has also been the field of her most recent journeyings, for a week has not yet elapsed since we completed our return voyage from Lueb Station. Of the first journey you have already had an account,* and you will since have discovered that what we took to be the Lake Leopold river was the Kasai, and that we journeyed upon the waters of that important tributary without knowing it. The Lake Leopold river, as I

* 'Proceedings R.G.S.,' 1885, p. 353.

have now seen, and as indeed Mr. Stanley's new book had told us, falls into the Kwa just beyond Mushie; and later I have learned from Lieutenants Kund and Tappenbeck that the Lukenye, which I suppose joins the Lake Leopold river at Grove Island on Mr. Stanley's map, is an important and far reaching navigable stream. From the description of the place given by Lieutenant Kund, and the accounts of the natives, there can be no doubt as to the point where his expedition crossed the Kasai. I make it in 3° 41′ S. lat., and about 18° 40′ E. long. Lieutenant Wissmann, the pleasure of whose company we had on the upward portion of this last journey, makes it further east, but we are both very considerably westward of the position to which Lieutenant Kund thought he had attained. The difficulties he encountered in the long overland march, and the terrible hardships his expedition suffered are more than enough to account for his being "out."

The latest news (you heard it by last mail I expect) is that which we brought down of Dr. Wolff having explored the Sankuru and proved it navigable to beyond the town of Mona Katchichih, and also of his having ascended for seventy miles or so a river which falls into the Sankuru from the north-east and known both as the Luecho and the *Lomami*. I can hardly bring myself to believe that this is the Lomami of Cameron and Wissmann which we supposed a while ago to be the river which flows into the Congo just below Stanley Falls, and which I ascended as far as 1° 33′ S. lat. in January of last year. Lieutenant Wissmann is inclined to regard this new Lomami as identical with the Lukalla of his previous journey.

During our recent ascent of the Kasai we paid special attention to the southern affluents with a view to obtaining an idea of their comparative size. The following are the results; but there are so many disturbing elements which enter into the problem of volume as determined by current-meter and lead that they can only be looked upon as comparative.

	S. Lat. (Observation).	E. Long. (By account, Leopoldville being 15° 25′).	
	° ′	° ′	
Kwango	3 11	17 30	145,000 cub. ft. per second.
Luballa	3 42	18 50	9,000 „ „
Lebui	4 12	19 20	10,000 „ „
Etembwa	4 17	19 30	24,000 „ „
Kasai (above Lulua?) ..	5 5	20 30	54,000 „ „
Lulua	5 22	20 40	27,000 „ „
Luebo	..	..	8,000 „ „
Sankuru	4 18	19 50	42,000 „ „

At about one hundred miles north-east from Leopoldville the Kasai pours its waters into the Congo through a deep-cut channel between the hills which bound its left bank. This range of hills extends about two hundred miles beyond the cataract region to the edge of the great central depression of this part of the continent. The channel through this

range of hills is narrow, tortuous, and deep; so deep that with a line a hundred and twenty feet long we could get no soundings. The current is very strong at the confluence, where it is not more than 700 yards wide, and at one or two places a little higher up where it is not more than a quarter of a mile wide, it runs at the rate of seven or eight miles an hour. But though the current has been strong enough to cut its way through the hills, it has not yet carried away those portions of their rocky skeletons which in the shape of reefs it has left bare, to the chagrin of those who have to navigate its first twenty miles or so. However, the rocks are soon passed, and the narrow rapid river widens out, and communication is opened up with a series of magnificent channels, stretching away north and east and south, which are destined to play a most important part in the future commercial welfare of the Congo State. In fact, from what I have seen, I judge that this great affluent will be the first to show any "returns," as it furnishes a highway to countries where an extensive trade already exists, and which up to the present has had to encounter all the difficulties of a land march of a thousand miles. Portuguese traders are already aware of the new and easy route that is now opened up, and one of them whom I met has three hundred tusks of ivory ready, and will shortly send them to the coast, viâ Stanley Pool. I judge this venture will prove a very profitable one, as I saw a tusk worth 3*l.* in England bought for two necklets of glass beads.

After leaving the Kasai mouth the Congo receives no other affluent on the left bank till we approach the Equator, but on the right bank after fifteen miles or so we come to the Lefini. This river, however, is only navigable for two or three miles; the hills, unlike those which separate the basins of the Congo and Kasai, throwing up an unsurmountable barrier. By the time we have reached the second parallel of south latitude the hills which bound the right bank have given place to level country (they extend a few miles farther on the opposite bank) and we have come to the mouth of the Mikenye, which we ascended for fifty miles or so, so far as was possible in a steamer seventy feet long. The Bangulu-ngulu people whom we met on this river are a branch of the great Bateke tribe; they were but few in number, and did not appear to use the river as a means of communication; the swiftness of the current and many curves may possibly account for the absence of canoes. Dr. Ballay told me that the Mikenye was one of the mouths of the Alima delta, in this case the delta would include a hill 150 feet high within its limits.

The Alima, which is the next in order among the affluents as we ascend the right bank, is a stream which roughly measured gave an outflow of 8000 cubic feet per second, while the Mikenye did not give more than half that quantity.

The Likona-Mbunga, which flows into the Congo some 30 miles higher up, gives a very much greater outflow, though its volume is

masked by its many mouths. The main stream of the delta some five miles up, and not far from the head, gave a result of from 30,000 to 40,000 cubic feet per second.

A few miles beyond this last-mentioned affluent, and after having traversed a degree of latitude of low-banked water-way, since leaving the high land opposite Bolobo, we come to 1° 6′ S. lat., and to the rocky shores of hilly land which forms the water-parting between the Likona and Mobangi rivers.

When we set out upon our journey, besides following the banks of the main stream so as to be able to report upon the population of the various districts, our purpose was to visit some of the tributaries, but we were not prepared for losing our way, and for finding ourselves 100 miles up one of these tributaries instead of on the Congo. The fact is, the Mobangi has so wide a channel, so many islands, and a course so nearly identical in its lower reaches with that of the Congo, that the mistake though apparently absurd is comprehensible. As soon, however, as we were beyond the first parallel of north latitude, and I could not find the town of Libongo, the first town I had seen on the right bank on crossing the river in this same latitude on my previous voyage, the case was clear that we were not on the Congo, and we had to turn round and go down stream. Not, however, till we had taken in a supply of food, for which we were in great straits, for we had not been able to buy anything for some days, as the people as soon as they caught sight of us ran away, crying out, "bedimo! bedimo!" (ghosts! ghosts!) The assertion that we were men like themselves, that we ate and drank, and were now hungry, that we slept as they did, and that we had the same number of fingers and toes as they possessed—arguments usually sufficient to convince the native mind—were in this case without effect upon the timorous Baloi. There was nothing for it but to lay siege to one of the towns where an abundance of food was visible, and after about four hours holding off and on, and threatening not to go away till we got something to eat, at last, after a series of tactics that only hungry people could bring themselves to indulge in, we were able to get into communication, and a little while later to go away with as much food as we could carry, and at the same time to leave excellent friends behind us.

By following the left bank of the Mobangi as we descended, we joined the Congo 25 miles south of the equator, or 15 miles north of the point where first we struck the Mobangi delta. Following the right bank of the Congo, it was not till we were some 40 miles beyond Bangala that we found another affluent, a stream from the north-east, for which I could get no other name than "Ngala" (a river). It is a stream of some 25,000 cubic feet per second, and evidently furnishes a water-way for a very considerable distance, but we did not ascend it for more than 30 [miles, through the whole of which distance it was bounded by

uniformly low banks, and at high-water scarcely afforded a site for the larger and important trading community of Mobeka.

No other affluent of considerable size is met with till we reach the Loika or Itimbiri, in about 22° 20′ E. long. Though this river is not much larger than the Ngala it is very much more interesting, the whole of its course from the Congo to the Lobi Falls, a distance of over 120 miles, being through picturesque and hilly, as well as populous country. In addition to houses of the "extinguisher" type, described by Mr. Stanley as characterising the towns on the Biyerre river, we found well-built clay houses which were extremely neat and pleasing in their appearance. If style of architecture may be taken as indicative of race, then we encountered three different tribes, those who lived in the four-sided grass and mat houses, such as are found on the Congo; those who lived in the round houses, and those again who built substantial dwellings of a much higher type with clay walls. Lobi Falls, or rapids, in 2° 50′ N. lat. and about 23° 30′ E. long., is interesting as being the nearest point to the Soudan which has yet been attained from the south-west. We were very much disappointed to find our way barred so soon, as we had begun to hope it would prove to be a route by which we might approach within a practicable distance of the Welle or Shari valley, and thus realise the hope of the donor of our steamer, who is desirous that our Society should engage in mission work in the Western Soudan. It is possible that in the high-water season the falls may disappear and a passage for canoes at least be practicable; the people were evidently in communication with the higher reaches.

As the Aruwimi (or Biyerre) people were not inclined to be friendly, and as we already know from Mr. Stanley's explorations that it offered no advantages as a route northward, we did not ascend this important tributary but passed on till we came to the Mbura. After making our way for two or three miles up this stream, we found that it carried to the Congo the waters of two separate branches, one from the east the other from the north-east. The latter, which is about 100 yards wide, is the larger of the two, and after ascending it for some seven or eight miles we found our way barred by rapids, though it was quite feasible for canoes, and possibly at high-water even for ourselves. The eastern branch was not avail ble for even the short distance which we ascended the other, and then, when our way was stopped, it was stopped most completely by a sheer fall of 40 feet.

After having spent Christmas at Stanley Falls we started down river again before the new year. It had not been a very merry Christmas, for we were among Arabs, and the memory of their terrible doings a little lower down river was still fresh upon us. Having started, a few hours brought us to the mouth of the Lomami and the Arab camp there. The fact that these marauders had met with a reverse and lost one or two men and guns up this river, only strengthened my wish to

ascend it. I felt quite anxious to go and make friends if possible with people who were strong enough to make a stand and defend themselves. It was a task which took time and much patience, but one in which we were eminently successful. However, after a while, we had pushed beyond the range of our friends and found ourselves among wild people, who had hid themselves in the bushes along the banks and sent flights of arrows after us. This hostility was explained afterwards when we learned that the notorious Mtagamoyo (the "butcher") was leading an expedition in the neighbourhood, and that consequently all the country was in a ferment of excitement. But suffering no harm we passed on, and were surprised to find ourselves among people who spoke the same language as our interpreter from the Equator Station, they being members of the same great Balolo family, which we afterwards proved to extend along the equatorial belt for five degrees of longitude. The course of the Lomami was very tortuous, and its current very strong, sometimes as much as 400 or 500 feet per minute, our progress in consequence was very slow. We were a fortnight before we reached the first degree of south latitude, and then, as it took us another week to reach 1° 33′, we thought it was quite time to turn back. We left it at a point where it was still a stream of 35,000 cubic feet per second, and at an altitude of 1350 feet above the sea.

For five degrees of longitude the great northern bend of the Congo between the Lomami and Lulanga receives no tributary of any size, though we sought carefully; the most important was the Bokumbi, a stream of from 2000 to 3000 cubic feet per second, which falls into the Congo a few miles eastward from Bangala on the other bank.

This long stretch without any important affluent was, however, explained on our following voyage when we ascended the Lulanga river and found that its course was nearly due east, and that, together with the Ikelemba and Juapa rivers, it made up a series of water-courses with curves analogous to that of the Congo, which drained the whole country west of the Lomami and north of the second parallel of south latitude.

Having left the Lomami we continued our journey down stream, our minds in the meanwhile being often occupied concerning our failure to find the hoped for avenue leading in the direction of the Shari valley. It was not very surprising then, that by the time we had reached the Mobangi, although we had been already four months on our voyage, that we determined to push our way up its stream and make one more effort before returning to Stanley Pool. All was simple enough as far as the point which we reached by mistake at the outset of our journey, excepting that in many places where we had had a fathom of water we now found sand banks high and dry. However, there was no lack of channels between the islands which through the five degrees of latitude which I have navigated are the characteristics of this river, as they are also of the Congo. Upon ascending this river it is not till we reach

2° 30′ N. lat. that we leave the low level land behind us and enter upon hilly country. Here, the leadsman's warnings of "hard" begin to keep us on the look out for rocks, but it is not till we have reached 3° 50′ that they seriously threatened to prove an obstacle, and even there by careful steaming we avoided them all. This was at dead low-water (February of last year), and as soon as the river commenced to rise there would be no difficulty at all. At 4° 27′ north we found the river break through a range of quartz and red clay hills a thousand feet high, which quite altered its course. Previously we had found the stream coming nearly uniformly from north by east; now we found that to cross this range of hills which ran north-west and south-east it had made a gap nearly east and west. Before we attempted to pass through this gap and between the immense masses of quartz which broke up the river into a semblance of rapids, we deemed it wise to anchor the *Peace*, and do some prospecting in the rowing-boat we had alongside before we ventured farther. As in our five-oared gig we got safely past everything and into the open water-way beyond without the use of ropes, we were assured that it was quite safe to make the attempt in the steamer. Half-an-hour after an early start on the following day we were safely through; but if we had the rapids behind us so had we also the friendship we had secured with much difficulty a few miles below, and we now found ourselves among people bent upon mischief, and we were compelled either to fight or beat a retreat. Our appearance at first seemed to inspire fear, for men, women, and children sought refuge in the fortlets they had constructed in the branches of the tall straight-stemmed trees, securing their retreat by hauling the rope ladders up after them. From these coigns of vantage they assailed us with flights of poisoned arrows, but as we were well protected by arrow-proof wire netting we went on our way unmindful of them. This was taken as a sign of weakness and as a good argument for following us in their canoes. The people on ahead seeing us apparently flying before pursuers came out in their canoes to meet us. If it had not been nearly sunset we might have run the gauntlet, but with unknown water before us and darkness coming on we had no option but to seek safety by flight in the direction we had come. The canoes were soon left behind and all went well till an hour after sunset and we were nearly past the last of the hostile villages; here the water shoaled after a succession of "two fathoms, two fathoms," to "one fathom, hard"; and then before the leadsman could give us the result of the next cast, we had struck with a terrific crash, and the water was rushing into two of our watertight compartments at such a rate that three minutes later it was up to the level of the river outside. I will not attempt to describe our feelings, among hostile people and in the dark as we were, they can be better imagined than described. Happily for us the *Peace* had been built in watertight divisions, and we were thus able to keep afloat, and a few minutes later to run her ashore

—at such a time it was not for us to ask whether the people were friends or foes.

An anxious night at last gave place to the watched for morning, by which time boards and clay and cotton waste had so sufficed to close the three principal holes, that we were able to bale out the water faster than it came in, and were thus in a position to continue our journey to the sandbank we knew of just below the "gap." Here, after a couple of days' hard work, we succeeded in fixing the three needed patches, which put us into good going order once more. Our return journey was a pleasant contrast to the upward one, for we were welcomed everywhere, our only difficulty being that we could not stay long enough to satisfy our newly made friends.

Mission Steamer *Peace*, Congo River,
29th April, 1886.

The Last German Congo Expedition, 1884–6.*

The expedition of the German African Association, which departed from Hamburg in April 1884, under the leadership of Lieutenant Ed. Schulze, had for its object the further exploration of the southern tributaries of the Congo, along which excellent work had already been done by Lieutenant Wissmann and Dr. Pogge. On the voyage out, Schulze dropped one of his companions, Dr. Büttner, the botanist, at the Gabon, with instructions to have a look at Dr. Soyaux's coffee-plantation; he landed another, Dr. Wolff, at Kabinda; the third, Lieutenant Kund, at Banana; and installed the fourth, Lieutenant Tappenbeck, at Ambriz, whilst he himself continued southward to Loanda and Novo Redondo in quest of porters. Men willing to go to the north were found, but the Governor-General politely refused permission for their embarkation on "foreign" service, and Lieutenant Schulze consequently was compelled to look to Loango, a not very promising field, for the porters required.

On November 14th all the members of the expedition were reunited at Banana, whence, soon afterwards, the head-quarters were removed to Tundua (Underhill). Here they parted, and whilst Lieutenant Kund and Lieutenant Tappenbeck took the road up the river to Leopoldville, Lieutenant Schulze and the others directed their steps to San Salvador. They all looked forward to a happy meeting at the residence of the Muene Puto Kasongo on the Kuango, whence, with united strength, they hoped to push their way far into the interior. Schulze and Büttner left Tundua on December 13th, with Congo people as carriers, and reached *San Salvador* on December 18th, 1884. The king appeared not overmuch pleased, for the operations of Stanley, the "Stone-breaker," had filled him with distrust. The porters were frightened with cannibal stories, and many deserted. Dr. Büttner notwithstanding made an excursion to the Arthington Falls (January 20th to February 1st, 1885). Dr. Wolff reached San Salvador on February 2nd. Lieut. Schulze, the leader of the expedition, died soon afterwards, on February 15th.

On February 27th, Dr. Wolff left San Salvador for *Damba* (Ndamba), a dis-

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* From the 'Mittheilungen' of the German African Association, and the 'Verhandlungen' of the Berlin Geographical Society. For Map, see p. 680.

trict to the south-east, where he hoped to secure carriers. In this he failed. But in the neighbouring district of *Kúso* an opportunity for reaching the Kuango unexpectedly presented itself, and although only attended by six Loango boys, he did not allow it to escape him. On April 6th he arrived at the residence of the Kiamvo, but he vainly besought that prince to assist him in opening up the country to the eastward. On May 15th, Dr. Wolff was back at San Salvador, and soon afterwards he returned to the coast.

Dr. Büttner had in the meantime given up all hope of being able to penetrate into the interior with the aid of Congo porters. He therefore hastened to Loango, where he succeeded in engaging eighty men, with whom he left *San Salvador* on June 27th, 1885. His route led past the Arthington Falls and through *Sombo* and *Kongo dia Lase* (Shikongo) into the country of the *Mayakka*. On July 27th he entered the Musumba of the *Muene Putu Kasongo*. The country between San Salvador and the Kuango is hilly and even mountainous. The greater part is sterile and sandy, hard grass, with stunted trees or shrubs predominating. Oil-palms and other trees are found only in the vicinity of the villages and along the river-banks. The people of Damba, Sóso (Zosso) and Pumbo keep cattle. Rubber, tobacco, a dye made of a red wood, and palm-leaf cloth are the only commercial products. The Sombo are great traders in ivory, and are consequently jealous of caravans which pass through their country to the interior.

The capital of the Muene Putu Kasongo has about one thousand houses, enclosed within a stockade. The king received his presents graciously, and was quite ready to trade, but most resolutely objected to Dr. Büttner visiting the countries lying to the eastward. His people were exceedingly inquisitive. They freely sold goats, sheep, pigs, fowls, and pigeons, fish and dried mussels, bananas, ground-nuts, and oil. They always go armed, and are anything but conciliatory in their manners. Having vainly sought permission to go east, Dr. Büttner reluctantly turned to the northward. The Muene Putu Bungi feebly sought to turn him back into the San Salvador road. Passing the Kingunshi rapids of the Kuango (Major Mechow's furthest), Dr. Büttner crossed the country of the *Wavumba*, whose chief is the *Muene Kundi*, and ultimately reached the banza of the *Muene Kuako*, a jovial old fellow, with whom he emptied many a calabash of manioc-beer.

The further progress presented no difficulties. At *Ngatuka*, the residence of Queen Géu (Goy), Dr. Büttner and his caravan were mistaken for the Muene Kundi's people, but the misunderstanding having been cleared up, friendly relations were established. Three days further on he reached the town of the *Muene Putu*, a brother of Queen Géu, who rules over the Bansinik. This town occupies a hill, and boasts an audience hall capable of holding 1000 people. Still two days further to the north Dr. Büttner arrived at the banks of a river, about 1000 yards broad, which he was told was called Kuango or Nzadi Bulumbu, and which was evidently the Congo above Stanley Pool. On September 21st Dr. Büttner at length reached Leopoldville. It was his intention to return to San Salvador by land, but his carriers deserted, not even waiting to be paid for their services. Before returning to Europe Dr. Büttner was afforded an opportunity of ascending the Congo in the *Henry Reed* as far as Equatorville (October 29th to December 5th).

While Dr. Büttner and Dr. Wolff were engaged in the exploration of the Congo proper, and of the region between San Salvador and the Kuango, Lieut. Kund and Lieut. Tappenbeck journeyed up the Congo by the usual tourist path and reached *Leopoldville* on April 14th, 1885. There an opportunity presented itself of ascending the river in the *Henry Reed* to *Bangala*, of which Lieut. Kund availed himself, leaving the task of bringing the remaining stores up to Stanley Pool to his companion. On June 4th Lieut. Kund returned from his trip, and on August 9th

all preparations for starting into the interior had been completed. The first point aimed at was the residence of the *Muene Putu Kasongo* or *Kiamvo*, where Lieut. Kund hoped to meet with Dr. Büttner and Dr. Wolff. The country which had to be traversed possesses few charms, and is described as hardly habitable. Lieut. Kund, afraid of the desertion of his Loango porters, purposely avoided the villages of the *Bakongo*, *Basundi*, and *Basombo*, through whose territories he travelled, and when his caravan reached Kiamvo's residence, after twenty-eight days' continuous marching, his men were pretty well exhausted. The *Mayakka* and their ruler proved friendly, and although Lieut. Kund was not permitted to go direct to the east, he nevertheless effected his purpose by crossing the Kuango lower down, and at once passing into the country of the *Bokanye*, an inhospitable tribe, with whom he had the first hostile encounter when approaching one of their villages. Lieut. Kund altogether came fifteen times into collision with the natives. He is careful to tell us that he did all he could to conciliate his enemies, and never had recourse to fire-arms except in self-defence. The country between the Kuango and the *Wambu* is hilly, and difficult to travel through owing to the deep valleys which intersect it, but all beyond, as far as the *Sankurru*, stretch undulating steppes or savannas, now and then covered with lolo-shrub. The rivers flow in deep channels cut in the laterite, and their banks alone are wooded. The fan-palms which were scattered over the plains were withered owing to a recent drought. Game appears to abound, and elephants are more especially numerous on the banks of the Kuilu. The *Pambala*, who inhabit this region, are described as a good-natured people. They dress in grass-cloth, which they make themselves, of excellent quality; dress their hair in an elaborate manner, and tattoo slightly. Their weapons are flint guns, bows and arrows. They cultivate manioc, bananas, plantains, and tobacco of excellent quality. Ground-nuts and maize are grown to a limited extent; sugar-cane grows wild. The fruit trees include the oil-palm, the safo tree, and orange trees, yielding a very bitter fruit. Goats, fowls, and dogs are kept everywhere; pigs, pigeons, and cats occasionally. The villages are few and far between. The Pamballa disclaim being cannibals, but not so their neighbours, the *Bayeye*, who boast of the practice, and whose villages exhibit convincing traces of it. The languages of these tribes are scarcely intelligible to the coast tribes.

On reaching the *Sankurru*, known in its lower course as Bohimbo, Bohim or Nzadi Kama, no boats were forthcoming, and after some delay Lieut. Kund determined to build boats himself, which was accomplished in five days. In these boats the river was crossed. It forms numerous islands, the broadest arm having a width of 500 yards. The villages on the other bank were found to have been deserted. Only occasional glimpses of natives were obtained, but the beating of their drums and the rattles of the priests were heard incessantly. The nature of the country differs completely from that to the west of the river, for a primeval forest of vast extent takes the place of the savannas. Palms here intermingle with gigantic exogenous trees. The soil is loam, and of great natural fertility. The rains appear to be copious and regular. The villages of the *Basengo* or *Zenge* are built in clearings in these forests.

Crossing this forest region for thirty days, all the while unable to establish friendly relations with the Basengo, Lieut. Kund came upon a river, 450 yards wide, and flowing swiftly to the west. This was the *Ikatta*, also known as Lukatta or Lukenye, which was subsequently found to join Stanley's Mfimi, the effluent of Lake Leopold. The river abounds in fish and hippopotami, and large herds of buffaloes frequent its banks, but that which struck the explorers most were bats and grey parrots, whose numbers were enormous. Lieut. Kund crossed to the north bank, but finding the country uninhabited, returned, and continued his journey to

the eastward. He established peaceable relations with King Gakoko, the ruler of the Basengo and Bikalli. The latter are smaller in stature than their neighbours. They tattoo the chest, and concentric circles on the upper arm appear to be their tribal mark. With these people Lieut. Kund had two fights, which cost him two men killed, seven wounded, and five valuable loads.

The *Bavumbo*, beyond the Bikalli, no longer own allegiance to the Gakoko. They are of small stature, tattoo circles on the chest and the upper arms, and are armed with bows, spears, and shields. On December 15th, whilst the caravan was entangled in the midst of the forest, the Bavumbo attacked it. Lieut. Kund himself was struck by three arrows, which his companion cut out with a razor. The rain fell in torrents during the night. Ammunition began to fail, and the discovery of a manioc field on the third day alone saved the caravan from starvation. It was resolved, under these adverse circumstances, to abandon the easterly route, and to descend the river in boats to the Congo. The building of these occupied three weeks, but so expeditious is river-travel as compared with land-travel, that the hospitable station of Leopoldville was reached on January 28th, 1886. Lieut. Kund's wounds having been attended to by Dr. Mensel, a physician in the service of the Congo State, he returned home at once, leaving Lieut. Tappenbeck behind to wind up the affairs of this, the last German Congo expedition.

The extensive land journeys accomplished by Dr. Büttner and Dr. Wolff, and more especially by Lieuts. Kund and Tappenbeck, have not only very substantially enlarged our knowledge of the Congo basin, they have also shed some light upon the earlier explorations of the Portuguese and of the Italian missionaries. We propose to deal with this subject on a future occasion, and merely draw attention to the fact that the Kúso (Nkusu), the Zoso (Musoso), the Sombo, the Sundi, and Yakka, are all of them tribes easily recognised in the earlier narratives. The Sombo (Mosombi), so Cavazzi tells us, are the inhabitants of Batta. The route laid down on Dapper's map as leading from San Salvador to the Kuango can now be laid down with confidence on our map, for the ancient "Condi" is in our day represented by the Muene Kundi, whilst "ó Canga," beyond the Kuango, is evidently identical with Lieut. Kund's "Bokange." The Wambu is the Wamba or Umba of the old writers. Whether Lieut. Kund's Basengo are the Basongo of the old traders is very doubtful. Another interesting feature is the similarity in the names of some tribes living along the southern tributaries of the Congo, and of others living as far south as the Kunene and Zambeze: thus, Badima = Adima (in Shidima), the Monomotapa's people; Pende = Pende on Upper Cunene, above Luseke; Balula = Lula on tributary of Cubango river; Bayeye = Bayeye or Bakuba, north of Lake Ngami; Basaka = Masakka (Mashasha) on Upper Cubango; Bangola = Ba'Ngola (Angola). This points either to similarity of language, if we suppose names like Adima, Pende, Bayeye, Balula, Basaka, and Bangola to be merely descriptive, or to an extensive migration of tribes.

The Alpine Pass of Hannibal.

By Douglas W. Freshfield, sec. r.g.s.

Map, p. 680.

Some years ago I ventured, in disregard of Dr. Johnson's deprecation of any further mention of the Second Punic War, to discuss in detail in the 'Alpine Journal' (No. 82) the various theories put forward in the old-world controversy as to the Pass of Hannibal. I then stated the case for a track recognised by another great captain, Napoleon, as the most proper for a 'Route Impériale de l'Espagne en Italie,' the Col de l'Argentière, leading from Barcelonnette to Cuneo. A short summary of my argument, so short that I now venture to reprint it, was at the time published in these pages.

"If we trust Polybius alone, the Pass of Hannibal must be left an open question as between the Mont Cenis, the Mont Genèvre, and the Col de l'Argentière; if we take Livy into account, we are confined to the road up the Drac to Gap, and the passes leading from the Durance; and if we may believe the fragment of Varro preserved by Servius in his Commentaries on Virgil, which many critics have strangely pronounced unintelligible, we must decide for the Col de l'Argentière. Varro mentions five passes beginning at the sea and ending with the Graian Pass, and takes Hannibal over the second. These Passes are now represented by the five carriage-roads of the Cornice, the Col de l'Argentière, the Mont Genèvre, the Mont Cenis, and the Little St. Bernard. Proof is brought forward that the Argentière route was used by the Gauls and Romans, and the ground is said to be suited to the adventures attributed to the Carthaginian army. To these a parallel may be found in the difficulties encountered by French armies on the same route in 1515 and 1744. The loose and (had we not the original authorities) in some respects unintelligible narratives of the former campaign given by Sismondi and Michelet may further be compared with the narratives of Hannibal's march given by Polybius and Livy."

I did not then think it would be proper to encumber columns which have hardly space "to comprehend new things" with a lengthy lucubration on rusty antiquities. Nor do I now propose to go into the question in detail in a controversial spirit. But it seems to me that it may be interesting to many readers of the 'Proceedings' to be informed of the great change which has taken place recently in the position of this long-lived controversy, and to be furnished with a map which may show with tolerable clearness the main lines of march which have been put forward by more or less competent critics.

Two considerations chiefly moved me to join in the fray. The first was a strong sense that the character of Polybius as a topographer was frequently somewhat misunderstood, and that his claim to accuracy in details was being exaggerated. The second was the discovery that the case for the Little St. Bernard was being supported at an English university by statements not in accordance with physical facts, and that in all the arguments in its favour from the days of Brockedon and Dr. Arnold downwards there was a marked absence of any satisfactory answer to the great objection, the distance from the crest to the Italian plain, and the difficult character of the lower gorges of Val d'Aosta.

I am glad now to be able to show that in France, Germany, Switzerland, and England, there has been a contemporaneous reaction against the depreciation of Livy's narrative of the Second Punic War, and the exaggerated estimate of Polybius's claims as a geographer, and that consequently the prevailing opinion is now in favour of a route lying through the basin of the Durance, and the Little St. Bernard has lost,

both abroad and in England, the position of first favourite, which, mainly owing to Mommsen's influence, it had a few years ago attained.

I propose here, not to insist again on my own views (which may readily be studied elsewhere by any one who cares for them) but to summarise briefly the contributions of the most recent critics. I shall begin with that of Mr. T. W. Arnold, who in re-editing his grandfather's chapters on the Second Punic War, has recently taken occasion to treat the questions of the comparative geographical authority of Livy and Polybius, and of the Alpine Pass crossed by the Carthaginian army, in two notes of great clearness and ability, in which he has managed, as I think, to sift the wheat from the chaff of previous disputants (including myself) with singular success.

On the first point, Mr. Arnold quotes from Dr. Arnold's previously unpublished notes and letters the following expressions:—

"I have been working at Hannibal's passage of the Alps. How bad a geographer is Polybius, and how strange that he should be thought a good one." "Polybius is so very bad a writer."

In this unfavourable view, Dr. Arnold was, his grandson shows, at the time almost solitary. Niebuhr held the opposite opinion, and in our own day the weight of Freeman's, Capes's, Bosworth Smith's, and Mommsen's general approval, together with the uncompromising eulogy of Nissen, has been thrown into the favourable side of the scale. Now, however, the adverse view of Polybius as a topographer is no longer the eccentricity of a single historian, or the audacity of an Alpine traveller. Mr. Arnold quotes on this side from Bunbury, Droysen, Ihne, and Neumann. The last-mentioned writer, the author of "the most recent, full, and competent discussion of the whole period that has appeared in Germany, raises his conviction of Polybius's incapacity and untrustworthiness as a geographer almost to the level of an axiom." Mr. Arnold goes on: "The general tendency of modern criticism is undoubtedly towards Dr. Arnold's unfavourable view, which was a revolutionary heresy at the time it was expressed, but is now on its way to become a commonplace."

Mr. Arnold also confirms, on the authority of Nissen, the opinion I had formed independently, that the particular books of Livy that deal with Hannibal in Italy were composed not recklessly and loosely on the authority of previous compilers, but after a conscientious study of the chroniclers contemporary with the events.

This expression of opinion might be thought hardly necessary by one who has studied only Livy's own text, and found in it such expressions as, "Nihil auctum ex vano velim, quo nimis inclinant scribentium animi;" "Inter omnes constat." But one of Livy's most recent commentators in this country has gone out of his way to express disbelief, not only in the historical statements of his author, but also in those which Livy repeatedly makes with regard to the authorities he has referred to. Mr. Capes "thinks it is not unlikely" that Livy should have "freely used" the compiler Cœlius Antipater, who lived a hundred years after the events, in preference to the contemporary annalists, "with little effort to hunt up his authorities or to compare the various sources fused into the current narrative." And a Swiss writer, Dr. Dübi, has also fallen into the same strange belief as to Livy's exclusive reliance on Cœlius.

The importance to the geographical question at issue of our estimate of the relative authority of Polybius and Livy is obvious. The claims of the Little St. Bernard are based on a literal interpretation of two passages of Polybius, in which he says that from the confluence (of the Rhone and Isère) Hannibal marched *along the river* 800 stades, and that he fought a battle with the *Allobroges* at the entrance to the Alps. If in these two passages Polybius wrote with modern precision, it

is clear that Hannibal marched on up the Rhone and fought his first battle in the proper territory of the Allobroges north-west of the Isère. But if Polybius wrote loosely, if Rhone-country, Alps, and Po-country were three broad distinctions, to be translated Rhone basin, Po basin, Alpine region; if the word *Allobroges* was given by Roman authors (as Circassian has been by English) a very wide and often inaccurate extension, the basis of the whole controversy is shifted. In this case the groundwork of the Little St. Bernard theory is cut away, and little remains to support it, for Dr. Arnold, the champion of the St. Bernardites, himself makes his confession:—"I cannot trace those particular spots which De Luc and Cramer fancy they could recognise. I thought so on the spot when I crossed the Little St. Bernard in 1825 with Polybius in my hand, and I think so still."

Having cleared the ground on this point of literary criticism, I proceed to give the most recent opinions on the main geographical question at issue.

Mr. Arnold, while misdoubting my attempted reconciliation of the two authors, accepts the authority of Livy as against that of Polybius, and decisively rejects all the northern passes. "It remains," he writes, "to state briefly the case as between the Mont Genèvre and the Col d'Argentière. To some of Mr. Freshfield's arguments, particularly those relating to the supposed difficulty about the Insubrians, which I think Neumann has successfully shown to be no difficulty at all, I attach but slight importance." [As to the Insubrians, I had, before I read Mr. Arnold, committed to print my recantation. On further study I had arrived independently at the same conclusion as Neumann and Dübi.] "But the personal impressions of a man with Mr. Freshfield's knowledge of the Alps have their weight, and Mr. Freshfield says, 'So far as I can judge, after having made a personal inspection of the routes, the natural features of this pass and its approaches agree better than those of any other with the accounts given of Hannibal's march by Polybius and Livy.'* His great argument, however, and a really strong one, is the passage which he quotes from Varro: 'Alpes quinque viis Varro dicit transiri posse: una quæ est juxta mare per Ligures; altera quâ Hannibal transiit; tertia quâ Pompeius ad Hispaniense bellum profectus est; quarta quâ Hasdrubal de Galliâ in Italiam venit; quinta quæ quondam a Græcis possessa est, quæ exinde Alpes Graiæ appellantur.'† Now this list certainly appears to give the passes in their geographical order from south to north, and if this is so it is not easy to find a flaw in the interpretation of Mr. Freshfield who reads them off as follows:—(*a*) Cornice; (*b*) Argentière; (*c*) Genèvre; (*d*) Cenis; (*e*) Little St. Bernard.‡ In other words, an early and careful author like Varro expressly tells us that Hannibal crossed by the Col d'Argentière. A letter of Pompey, preserved by Sallust, also says that he (Pompey) took a different route from that of Hannibal, and one more convenient to the Romans (nobis opportunius). Hermann Schiller recognises the force of Freshfield's argument, but objects that the first of the passes mentioned by Varro may have been the Col di Tenda. This, however, would make no difference. The second pass to the northward would still be the Col d'Argentière. Nor will it do to make the Col di Tenda the second pass,

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* Alp. J., xi. p. 290.

† "Preserved by Servius on Virg. Æn., x. p. 13."

‡ "Hasdrubal seems to have made his way further north into Gaul than his brother, to judge from Livy, xxvii. p. 39: "Non enim receperunt modo Arverni," &c., and would therefore naturally cross by one of the northerly passes. It is, perhaps, worth mentioning that Appian, whose authority, however, on any geographical point is null, says in contradiction to Varro, that Hasdrubal took the same pass as Hannibal: Appian, Hannibal, 52." (I may add that Hasdrubal passed the Pyrenees at their western extremity.—D. W. F.)

as it is altogether out of the question that it should have been the pass used by Hannibal. On the whole we must admit with Schiller 'that the chances of the Mont Genèvre and Col d'Argentiere have decidedly improved.' I should be disposed to go even further and to say that Mr. Freshfield, who has the advantage of being the last man to review the whole question in the light of his predecessors' labours and of his own personal experience—for I do not regard Colonel Perrin with his Col du Clapier as a serious rival—at present holds possession of the field."

So far Mr. Arnold, whose whole essay deserves careful consideration as a luminous summing-up of a wearisomely conducted discussion.

Dr. Dübi, the President of the Bern Section of the Swiss Alpine Club, has recently published, in the 'Jahrbücher' of his Society (vols. xvi., xvii., xix., and xx.), a series of interesting and instructive articles on the early history of the Alps. Beginning in 1882 with a collection of the references to the Alps in classical authors, he proceeded in the following year to a short summary of the Roman campaigns in the mountains. He is now engaged on the Roman roads in the Alps, and has in two papers completed his task so far as the Western or Gallic Alps are concerned. All who are interested in the subject will compare curiously the opinions arrived at by Dr. Dübi with those of other recent writers; for example, with the ingenious but somewhat fanciful views of Signor Vaccarone and the painstaking literary (but never local) researches of Herr Œhlmann.

Dr. Dübi commits himself to no decided opinion as to Hannibal's route from the confluence to the Durance. But he brings forward the opinion of the French Archæological Commission that the route up the Drac and over the Col Bayard was a Roman road, and one of those indicated in the Peutinger Tables. Here we have an important confirmation of the position I have asserted against many critics that this was one of the classical, as it is certainly one of the natural, routes between the Isère and the Durance.

I turn to the descent into Italy. On this question I think Dr. Dübi has thrown some valuable light; at any rate, he inclines me to follow him. He does not hold it by any means necessary, in order to satisfy the statement of Polybius, "that Hannibal, having crossed the Alps in fifteen days, descended boldly into the plains of the Po and the nation of the Insubrians," to believe that Hannibal met with Insubrians before he encountered the Taurini. Polybius, he considers, was looking forward, and writing in his broad manner passed over for the moment the fight with the Taurini. This very plausible conjecture, first put forward by Neumann, is consistent with the tendency I have previously noted in Polybius to take from time to time general views of the march.

Varro's catalogue of the passes naturally stands in Dr. Dübi's way. Like all critics who reject the Col de l'Argentière, he is bound to overthrow or disparage it. He does his best to this end in a lengthy and minute commentary, the conclusion of which is that the catalogue is 'only a literary product,' by which somewhat vague phrase I suppose him to mean that it stands in no close relation to physical and historical facts. I have endeavoured to give accurately the heads of Dr. Dübi's argument, with such running commentary of my own as it may seem to call for in Number 93 of the 'Alpine Journal.'

I couple with this notice of Dr. Dübi's paper a brief reference to a summary of recent contributions to the controversy in hand which has been furnished by Professor Schiller to the 'Berliner Philologische Wochenschrift.'* Professor Schiller

* June 7, 14, 21, 1884.

analyses my paper in the 'Alpine Journal' (No. 82), together with the works of the late Professor Neumann,* and two French officers—Perrin and Hennebert.†

Of these writers not one is in favour of the Little St. Bernard. Colonel Perrin is a partisan of the Mont Cenis with variations, or, to speak more precisely, of the Col du Clapier (8125 feet), a neighbouring bye-pass to which he has been reduced by the necessity he feels of finding a view of Italy. Like all Mont Cenisians, Colonel Perrin begins by throwing Livy overboard—a convenient but to my mind wholly illegitimate mode of simplifying the problem. Those, however, who can overlook this preliminary licence will find the task of fitting Polybius to the Arc valley worked out with great ingenuity and a thorough knowledge of the ground; and whatever influence it may have on the main question at issue, Colonel Perrin's book will doubtless be of value to students desirous to trace the old roads from the valley of the Arc to Italy. The line he selects for the Carthaginian army is by Aiguebelette and Montmélian to the Isère, thence across the hills by the Col de Montaudrey and Col du Pontet to the Arc at La Chambre, and up the right bank of the river through Villarey, Bourget, Amodon, and Aussois to his pass. His 'White Rock' is near the latter village. I agree with Mr. T. W. Arnold that "the only serious argument for the Col du Clapier is its view of Italy," and that this is not enough to counterbalance the many objections to it. "Colonel Perrin with his Col du Clapier I do not regard as a serious rival," adds Mr. Arnold, with my full assent.

Professor Neumann and Hennebert are both for the Mont Genèvre. The former brings forward many of the arguments already familiar in favour of a march through the valley of the Durance. The new suggestion he makes is his attempted reconciliation of Polybius and Livy as to the tribe among whom Hannibal descended.

He, with Dr. Dübi and Mr. T. W. Arnold, whom he anticipated, believes that Polybius when he stated that Hannibal descended "into the plains of the Po and the Insubrian nation," regarded his conflict with the Taurini as part of the passage of the Alps, and that Livy understood him in this sense.

Hennebert's peculiarity lies in the descent he adopts from the Mont Genèvre. He takes Hannibal over the Col de Sestrières and down the Clusone to Pignerol. The motives alleged for this fanciful route are the influence of the chieftain Magilus (identified as head of a tribe of Magali in the Clusone valley) and the desire to avoid debouching directly on an enemy's town—Turin.

I desire, in passing, to dispose of a misunderstanding of my German critic and to say that in my opinion—and here Mr. Bunbury agrees with me—exactness in distances has been made too much of in this discussion. An accurate measurement in a mountain country is a late result of civilisation, and rough estimates are, as a rule, exaggerated. So much for my own opinion of "the brilliant correspondences" on which Professor Schiller fancies I rely.

I would repeat that this caution may, in my judgment, be profitably extended to other incidents of the march. The pass to be looked for should not exactly correspond with, but be less difficult (to our eyes at least) than that described by the classical authors. In historical descriptions of mountain campaigns, no matter of what date, the difficulties of the ground are as a rule considerably exaggerated. Readers seriously interested in the question should study carefully the records of the campaigns of A.D. 1515 and 1744, in both of which the Col de l'Argentière was crossed by armies, whose adventures, particularly those of Francis I., run parallel,

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* 'Das Zeitalter der Punischen Kriege,' Breslau, 1883.

† 'Marche d'Annibal des Pyrénées au Po.' (Privately printed at Grenoble, and practically unattainable.) 1883. 'Histoire d'Hannibal,' 1870–78, 2 vols.

altering only elephants to canons, in the most remarkable way with those of the Carthaginian host.

Professor Schiller's general conclusions are (to me) thoroughly satisfactory. He holds that the passes from the Durance are winning their way to acceptance; that the Little St. Bernard has been fairly disestablished; and that *if* the passage from Varro I quoted is genuine and trustworthy—a point he leaves open—the case for the Col de l'Argentière is made out.

After carefully considering these fresh contributions I still hold that as between the Mont Genèvre and the Col de l'Argentière the evidence, putting aside Varro, is very closely balanced, but that the scale inclines in favour of the southern pass. If we admit the passage from Varro, and assume that he was writing exactly, the question is, of course, solved. And Dr. Dübi's assault on Varro's statement appears to me singularly ineffectual; but on this point I am prepared to bow to more competent scholars than myself. For, while I protest with the most positive conviction against all the northern passes, I cannot work myself into more than an advocate's partiality for the Argentière over the Mont Genèvre. I fully admit that the sentence from Varro may be impugned, and that if it was once out of the way some stress might fairly be laid on the fact that the Mont Genèvre seems pre-eminently the Taurine Pass. To make this confession, however, I fear is to show that I do not possess the first qualification for a Hannibalian critic—a perfect belief in my own infallibility!

Before laying down my pen let me indicate in a final sentence the probable outlines of the story of the Durance Passes as they have presented themselves to me in the course of this inquiry.

The Keltic hordes poured down through Gaul till they came to lands already occupied, and ill-suited for pasture.* The fame of Italy led many of their tribes up the valley of the Durance. When they reached its angle, unwilling to turn their backs to the sun, they held straight on over the broad downs of the Col de Vars, and up to the gentle crest of the Argentière. For centuries this remained—it remains to this day—a natural and frequented highway for the people on either side of the chain. Then the Romans, masters of the valley of the Po, approached the eastern base of the Alps, and, no longer content with sailing over sea, sought a highway to the Province and Spain. The broad trench from which the Dora Riparia issues—next to Monte Viso the most conspicuous physical fact in the view from Turin—led their generals on to the discovery of the Mont Genèvre and, when they wanted to go north—to Gallia, and not to Hispania or the Provincia—of the Mont Cenis. The Argentière lost much of its importance after the opening of the Mont Genèvre, as the Great St. Bernard has lost its importance by the construction of the Simplon road. In mediæval history it flashed out again into temporary notice, and then its very existence was ignored by the Dryasdusts who construct orography in their cupboards. Yet military engineers are still alive to its importance, and every year hundreds of sturdy Piedmontese, descendants of the old Ligurian stock, pour backwards and forwards over it on their way to and from their winter work in the cities of Provence.

The only contestable indication in my map, I believe, is the position assigned to the Tricastini, between the Drôme and Isère. In this I follow Ptolemy, who places them east of Valence, and among the moderns Mr. Long and and Herr Müller.†

Those who desire large-scale maps of the particular passes should procure the

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* See Livy, v. p. 34.

† See also 'Alpine Journal,' xi. p. 272.

French Carte Militaire de la Frontière (2s. a sheet) and the new Italian Survey (1s. a sheet) at Stanford's.

The heights of the passes over the main chain referred to are, according to the official surveys: Col de l'Argentière, 6552 feet; * Mont Genèvre, 6082 feet; Petit Mont Cenis, 7220 feet; Col du Clapier, 8125 feet; Petit St. Bernard, 7180 feet. I append a list of the principal recent works cited above.†

GEOGRAPHICAL NOTES.

Geographical Results of the Afghan Frontier Commission.—The Indian Government, at the suggestion of the Secretary of State, have commissioned Major T. H. Holdich, R.E., of the Indian Survey Department, to prepare a special report on the explorations, surveys, and, generally speaking, on the geographical work of the Afghan Boundary Commission.

Exploration of the Central Caucasus.—Messrs. C. D. Dent and W. F. Donkin, two of the most active members of the Alpine Club, have this year spent their summer holiday in exploring, with Alpine guides, the central group of the Caucasus, the peaks and glaciers encircling Koshtantau, 17,096 feet. Although much harassed by almost uninterruptedly bad weather, they succeeded in ascending Tau Tetnuld, the Jungfrau of the Caucasus (figured in Mr. D. Freshfield's 'Central Caucasus,' p. 328), the height of which was found to be about 16,500 feet, and in making other glacier expeditions, which will necessitate the introduction of many and important corrections in the maps of the district. The Caucasian mountains struck the Alpine travellers as stupendous, and the Koshtantau chain as the grandest sight they had ever looked on. Mr. Donkin has brought home a number of photographs of the scenery and people, which, if they at all equal his well-known Swiss views, will be most valuable

* I have written Col de l'Argentière, not d'Argentière, because the hamlet on the Italian side of the pass is figured in all the Government maps prior to the new Italian survey as L'Argentière.

† Capes, Livy, Books xxi., xxii. Macmillan, 1883.

Dübi, Die Romerstrassen in den Alpen. Jahrbuch der Schweizer. Alpenklub, vols. xix. and xx. Bern, Dalp, 1884–5.

Freshfield, D. W., The Pass of Hannibal. Alpine Journal, Nos. 82 and 93. Longmans, 1883 and 1886.

Hennebert, Histoire d'Hannibal. 2 vols. published. Imprimerie Nationale, Paris, 1870 and 1878.

Neumann, Das Zeitalter der Punischen Kriege. Breslau, Köbner, 1883.

Oehlmann, Die Alpenpässe im Mittelalter. Zürich, Jahrbuch für Schweizerische Geschichte, vol. iii. and iv., 1878 and 1879.

Perrin, Marche d'Annibal des Pyrénées au Po. Paris, 1883.

Schiller, Ueber den Stand der Frage, welchen Alpenpass Hannibal benutzt habe. Berliner Philologischer Wochenschrift, vol. iv. 1884.

Vaccarone, Le Vie delle Alpi Occidentali. Candeletti, Turin, 1886.

and interesting illustrations of a range and country which, though now brought within the reach of Long Vacation tourists, are still but imperfectly explored.

Desiccation of Central Asian Lakes.—M. Venukoff contributes to the August number of the 'Revue de Géographie' a summary of recent researches by Russian geographers on the changes which are taking place in the lakes of Siberia and Central Asia. The most important of these researches are described in a paper by M. Yadrintseff in the 'Izvestia' of the St. Petersburg Geographical Society (vol. xxii. fasc. i.). Two maps accompany this paper, one representing lakes Suny, Abyshkan, Moloki, and Chany in the Governments of Tobolsk and Tomsk, according to a survey made in 1784; the other the same lakes according to three surveys made in 1813–20, 1850–60, and in 1880. It appears from this series of maps, partly reproduced, with others in M. Venukoff's paper, that the desiccation of these lakes has been going on at a rapid rate. Lake Chany has much diminished in size, especially in its eastern and southern parts, but the greatest changes have been in the other three lakes. Whole villages have grown up on the site formerly occupied by Lake Moloki. Of Lake Abyshkan, which had a length of 40 miles and a width of 17 miles in the earlier years of the century, and whose surface was estimated at 530 miles, only three small ponds remain, the largest being hardly a mile-and-a-half wide. Lake Chebakly, which in 1784 was 40 miles long and 30 wide, is now represented by three small ponds, the largest having a width of less than two miles. The same process is going on throughout the lakes of West Siberia and the Aralo-Caspian region.

Mr. H. O. Forbes' New Guinea Expedition.—We have received from Mr. Forbes a brief preliminary account of his attempt to reach the summit of the Owen Stanley Range in New Guinea, from his camp at Sogere, near Port Moresby, where he had remained during the previous wet season. During his enforced stay at Sogere, he says he employed every available hour in collecting, making meteorological observations, and triangulating, and had surveyed the whole of the neighbouring country and obtained nearly 1000 species of plants, which he had sent home to the British Museum, besides a large number of birds. He had also cultivated friendly relations with the tribes of the interior and induced his Amboynese assistants to learn their language. At length, about the middle of April, he started, accompanied by the Rev. J. Chalmers, for Mount Owen Stanley, unfortunately insufficiently supplied for a long stay, owing to the exhaustion of his supplies and pecuniary means. Arrived in the territory of the warlike Ehe and Bereka tribes, who were readily conciliated, his party soon found themselves at the foot of the precipitous cliffs which form the base of the range. The natives, owing to their superstitious dread of the mountain, could not be

persuaded to accompany them, and beyond this point there were no more inhabitants or chances of obtaining food. The country was rugged in the extreme, a succession of chasms and steep acclivities clothed with dense scrub, without paths and without means of transport other than their own men. A magnetic disturbing force made their compasses unreliable. To advance further, it would be necessary to carry everything forward by easy stages to camps, each a little in advance of the other, cutting paths through the jungle. Mr. Forbes believes he could have reached the summit with the twenty men he had with him, if he had possessed the means to pay the men for a further term of service, their present term expiring on the 1st of May. But having exhausted his means, he was compelled, very reluctantly, to return. He believes that his plan of reaching the summit is the best practicable, and that any future explorer would have to adopt it. He reached Port Moresby early in May, and having disbanded his followers, proceeded to Cooktown in Queensland, intending to proceed to Sydney and move the Colonial authorities to subscribe means for a renewed attempt. But he has since accepted the post of Commissioner for South-eastern New Guinea with residence at Dinner Island.

The Kimberley Gold-fields, Western Australia.—A clear and instructive account of the newly-discovered gold-fields in North-western Australia was given in a paper by our Gold Medallist Mr. John Forrest, read at a meeting of the Victoria branch of the Geographical Society of Australasia, at Melbourne, on the 29th of June last, before an audience of some 500 persons, including Sir Henry Loch, Governor of Victoria. The Kimberley district, in the interior of which the gold-fields lie, is a fertile tract of country lying between King Sound and Cambridge Gulf in the tropical portion of the colony of Western Australia. It was first explored by Mr. Alexander Forrest in 1879, whose favourable report of the pastoral capabilities of the country was followed by its settlement; but it was not till 1883, when a Government Survey examined the interior, that gold was discovered over a large area by Mr. Hardman, the geologist of the party. The rapid influx of miners and settlers consequent on this discovery, necessitated the despatch of Government officials to the district, and Mr. John Forrest accompanied the party, which left Freemantle in the *Albany* on the 29th of March last. The *Albany* first visited the new town and port of Derby in King Sound. The town he describes as being pleasantly situated, but the entrance to the Sound by Sunday Strait is remarkable for the fierceness of the tide, which, he thinks, must run at the rate of some 15 or 20 miles an hour at spring tides. On the 14th of April the vessel arrived at Wyndham, the new settlement at the head of the western arm of Cambridge Gulf. This is pronounced by Mr. Forrest to be one of the finest harbours in Australia; it is protected from all weathers, has numerous bays, and good deep water, and the tide, though somewhat strong, does

not produce such dangerous currents as in King Sound. The Government steam-vessel, 250 feet long, was placed alongside of the bank within 70 yards of high-water mark. The "proclaimed" gold-field is 220 miles distant in the interior by the nearest route from Wyndham, and 320 miles from Derby in King Sound. It lies between latitude 16° and 19° 30′ S. lat., and 126° and 129° E. long. The metal is being found in good-sized lumps, the largest Mr. Forrest heard of being 19 oz. It is found at present on the surface, or nearly so, near the head waters of the Ord river, a fine stream flowing into Cambridge Gulf. Mr. Forrest visited the Ord river in its lower part and found the country in every direction clothed with green, luxuriant grass and the soil a rich alluvium. The nearest route to the gold-fields has yet to be explored. Mr. Forrest himself is inclined to think one or other of the smaller rivers entering the western arm of the Gulf would be the best starting-point; one of these, King river, he examined himself, and found it navigable by boat for 20 miles, in the straight direction of the fields. Some immigrants reach them overland from Port Darwin, which entails a land journey of 570 miles.

Mr. D. Lindsay's Explorations in Central Australia.—Mr. Lindsay * in his recent expedition has reached Lake Nash, after suffering considerably from want of water. The expedition, the immediate object of which was the discovery of fresh pasture grounds, started in October last from Hergott Springs (South Australia). The course of the Finke river was followed to the point where the river is lost in the sand to the north-east of Dalhousie. Lindsay then directed his course to the frontier of Queensland, which he crossed under 25° 30′ S. latitude. From this point he marched across a hitherto unexplored region to Charlotte Waters, the station of the Trans-Continental Telegraphic Line. In February he continued his journey across the eastern spurs of the McDonnell range to Lake Nash, where he arrived in April. A survey was made of the whole country traversed, and the course of the Finke and Herbert rivers accurately determined.

Mr. H. H. Johnston on the Cameroons River.—Mr. H. H. Johnston, who on his return from his Kilimanjaro expedition was appointed British Vice-Consul at the Cameroons, has sent home an interesting account of a journey made up the Cameroons river in June last. He started from Bell Town, and passing along the lower reaches well known to the European traders, reached a point a little beyond Ngale Nyamsi, a distance of about 60 miles. Mangroves cease about 24 miles from the coast; after them, the *Pandanus* or screw-pine becomes the dominant feature of the river-side, which is skirted along the swampy shore by a fringe of *Lissochilus* orchids, six feet high, rearing many a head of large

* For Mr. D. Lindsay's previous explorations see 'Proceedings,' 1884, p. 290.

mauve blossoms. As the banks grow higher and the soil firmer, the pandanus in its turn gives way to a great variety of forest trees, including acacias, sterculias, and eriodendrons, varied with the gigantic plume-like heads of the *Raphia* palm-tree, and clusters of the oil-palm. A little further up, the district of Wuri was entered, and Mr. Johnston was struck with its prosperous appearance; the banks of the river here present a continuous series of native villages and plantations, the primeval forest receding into the interior. A few miles beyond Ngale Nyamsi, the village of the chief of Budiman, he obtained, from a height about 500 feet above the river, on a clear day, a fine view of a chain of fantastically-peaked mountains lying due north, 50 or 60 miles' distance from the river. He estimated their height at 10,000 to 12,000 feet.

The Sekoli, a newly discovered tributary of the Congo.—The following information respecting the recent journey from the Upper Ogowé to the Sekoli, a northerly tributary of the Congo, by M. Jacques de Brazza, brother of the Governor of the French Congo, is taken from a geographical review by MM. C. Maunoir and H. Duveyrier, published in 'Le Tour du Monde' (No. 1329). Starting on 10th July, 1885, from Madiville on the Ogowé, M. de Brazza crossed the forest-covered country extending to the north. This region, inhabited by the Mbete and Ossete tribes, is fertile and well populated. After travelling a month through dense forests, the party emerged on to the great plains of the Mboko, and reached the Sekoli (the Punga of Grenfell), an important tributary of the Congo, at about 1° 30′ N. lat. This river separates the country of the Mboko from that of the Okota, a commercial but warlike people, inhabiting a belt of forests extending over nearly two degrees parallel to the Ivindo. The expedition then entered the country of the Jambi and stayed for a month at the village of Iloku (2° 30′ N. lat.), where they had arrived worn out with fatigue and fever attacks. Unable to procure guides for his journey further north in consequence of native opposition, M. de Brazza decided to return. He crossed the Sekoli again with the intention of descending that river to its junction with the Congo. On the refusal of the natives to furnish him with canoes, the party set to work and constructed several. After a month's toilsome navigation they reached the point where the Sekoli receives the Amboli and assumes larger proportions. Attracted by the salt to be found on the desert banks of the river, wild oxen, antelopes, elephants, and hippopotami swarm in this region. The travellers at last reached the station of Mbonga on 1st January last, whence they ascended the Alima, intending to proceed down the Ogowé to the coast.

Dr. Fischer's Expedition.—We regret to announce the temporary failure of Dr. Fischer's expedition * for the relief of Dr. Junker and

* See *ante*, p. 395.

his companions. According to the latest news, which is contained in a telegram to Professor Bastian published in the July number of 'Petermann's Mitteilungen,' Dr. Fischer arrived at Zanzibar on 21st June, after an absence of one year, without having been able to reach the unfortunate travellers in Unyoro. He started on 10th January last from Kagehi with the intention of reaching Unyoro round the eastern shores of Lake Victoria Nyanza, the more direct route through Uganda being closed through the hostility of the king. Marching through the hitherto unexplored region on the east of the lake, the traveller contrived to reach Lake Baringo. Here he was overtaken by famine, and his already slender stock of goods not being marketable among the Masai, he found himself compelled to return. His journey to the coast was accomplished viâ Lake Naivasha and the country of Kikuya. Meanwhile, news has been received in Zanzibar with reference to the whereabouts of Emin Bey and his companions. On 2nd July a letter from Dr. Junker, dated 10th February, should have reached Zanzibar, but the latest mail from East Africa does not report its arrival. This letter is reported to contain news of the outbreak of war between the kings of Uganda and Unyoro. A battle had been fought, and Dr. Junker had fled with King Kabrega to the country south of Lake Albert Nyanza. He had lost all his collections, but saved his diary. Emin Bey was, according to the same information, with Signor Cassati again on the Upper Nile in Wadelai, whence he was going to make an attempt to secure his provinces henceforward for the Egyptian Government. Nothing is said of the exact position of Dr. Junker,* or of the reason of Emin Bey's return to his province, but the news of the war between Uganda and Unyoro is confirmed as to date by Mr. Mackay, the English missionary in Uganda.

Lake Ngami.†—A German trader who has recently (1885–6) made the circuit of the Kalahari, by travelling from Wynburg in the Orange Free State through British Bechuanaland to Lake Ngami, and thence southward to Upington and back to Wynburg, furnishes some interesting particulars of the present state of Lake Ngami and its vicinity. He reached the lake on September 17th, 1885, and remained near it during three months, visiting during that time Moremi's new capital on the Tunke or Tioge. The Tuana (Batuana), whose chief is Moremi, owing to some recent raids of the Matabeli, have retired to the swampy region to the north of the lake. They are physically and morally a degenerate race, and their numbers do not exceed five hundred souls. The more wealthy among them have horses and are armed with guns. The Bakuba (Bayeiye) and the Bushmen are their slaves. The anonymous

* By later news, just arrived by telegram from Zanzibar, we learn that Dr. Junker has succeeded in getting through, and is now south of Victoria Nyanza on his way to the coast.

† 'Deutsche Kolonialzeitung,' 1886, p. 491.

trader thinks highly of the Kalahari for cattle-ranching, and points out that Lake Ngami is more accessible from Walvisch Bay than from the Cape or from Natal. Lake Ngami, according to him, is much smaller than it used to be, thus confirming what other observers have stated since Oswell, Murray, and Livingstone first visited the lake in 1849. Mr. Selous, during his recent visit to England, furnished some information on the rivers to the north of the lake, which he obtained from Dr. Aurel Schulze. According to this explorer, the Tunke (Tioge, or Lower Okavanga) no longer flows direct into the lake, but forms immense swamps to the north of it. One arm of it joins the Chobe; another (known as Dzo and Mashabe) loses itself into the Mababe Lake, but also sends an arm (the Tamalukana) southward into the Botletle, which flows in a south-westerly direction into Lake Ngami, and in a south-easterly direction into Lake Kumadan. The German trader gives a copious itinerary, with distances, but without bearings, and hence of but little use.

Upper Niger.—The French gunboat *Niger* which has been stationed on the upper waters of the Niger since 1883, made a voyage in the autumn of last year from Kulikoro to Jenne in Massina. M. Davoust, the commander, completely explored that part of the river, hitherto but imperfectly known to us from the accounts of Mungo Park and René Caillé. The once populous town of Sansandig, which at the time of Mungo Park's visit was still a considerable commercial centre, is now only a heap of ruins; the town fell a prey to the Tukuleurs after a long defence. M. Davoust has placed under French protectorate all the tribes on the left bank, while those on the right bank from Kulikoro to Sansandig remain under the yolk of the Tukuleurs, whose chief, Ahmadu-Cheiku resides at Segu-Sikoro.

Dr. Schinz in Herero and Ovambo-land.—Dr. Hans Schinz, a German botanist, has recently travelled extensively in the countries of the Ovaherero and Ovambo, in South-western Africa. Besides studying the geography and botany of the region, he has devoted some attention to the inhabitants and the languages. During an extended residence at the Finnish missionary station of Olukonda, in Ondonga, he compiled a vocabulary and grammar of the language, and whilst on a visit to Humbe on the Kunene, towards the close of 1885, he did the same for the Oñkumbi tribe. The following notes are from a letter to Mr. R. N. Cust, dated Olukonda, February 1886. The Ovaherero form three divisions, namely, the Ovatjimba in Kaoko ("waterless"), in the north; the Ovaherero proper in the centre; and the Ovambanteru in the east, on the borders of the Kalahari. They all speak dialects of the same language. Their original seats appear to have been far to the east, to the north of the Zambeze, and the country which they now occupy was formerly to a large extent in the possession of the Hau-Khoin or Berg-Damara. The tribes of the Herero are named after their chiefs, the most powerful among whom is Kamaherero. The government is patriarchal. The Ovatjimba, whom Dr. Schinz considers to be identical with the Bashimba or Muximba, also known as Cimbebas, are contemptuously named thus by their neighbours, the Ovambo. The

origin of the term is curious. The Ovambo inhabit fine "Omagumbos" or stockades, whilst the Ovatjimba content themselves with wretched huts, which are contemptuously likened to the holes which a vertebrate animal called the ondjimba builds in the gigantic ant-hills. Dr. Schinz has not as yet succeeded in obtaining a sight of this animal. The Ovatjimba differ in almost every respect from their neighbours, the Ovambo. They are cattle-rearers, and not agriculturists; they speak a different language, and have a patriarchal government, that of the Ovambo being despotic. The Uumbangala tribes to the north of the Kunene, including the Oñkumbi (Ovañkumbi), Eñkamba, and Omulonda, are linguistically related to the Ovaherero rather than to the Ovambo, though in other respects they resemble the latter. When Dr. Schinz was at Kumbi (Humbe) the Portuguese were at war with the Onkumbi, or he would have gone up the Kunene. The Ovambo between Kaoko, the Kunene, the Kubango, and the Ovaherero, comprise twelve tribes, namely, Ondonga, Uukuambi, Ongandjera, Uukuaruzi, Ombarantu, Ondombozora, Uukuanyama, Evale, Ekanda, Okasima, Ombandja onene, and Ombandja oshona. Each tribe speaks its own dialect; the six tribes named first constituting a western, the others an eastern group. The Finnish missionaries employ the dialect of the Ondonga in their services. Ovambo, or rather Ova-ambo, is an Herero term applied to these tribes, derived from *amba*, "the well-to-do," which an Omu-ambo uses when speaking of his own people. Dr. Schinz proposes to go to Lake Ngami, and will endeavour to obtain some insight into the languages spoken by the San, in the Kalahari, who are obliged to employ interpreters in their intercourse with the Bushmen of Nama-Land and the Khoi-khein. ;

West African Exhibition in Paris.—An exhibition of the objects collected by the French West African expeditions has been held at the Jardin des Plantes under the auspices of the Natural History Museum. According to a report by Dr. Hamy to the French Geographical Society, the exhibition has proved very successful, having been visited by nearly 30,000 people. The collections embrace the natural history and ethnography of the whole region between the rivers Kwilu and the Mobangi. Dr. Hamy's paper had special reference to the anthropology of the native tribes. He divides the numerous negro tribes of the region into five groups: (1) the Akoa or Western Pygmies, nearly related to the Akkas or Tikki-Tikki of Schweinfurth and Miani, who are scattered all over the least habitable parts of the country, viz. the estuary of the Ogowé, the Njavis Mountains, &c.; (2) the Congos, inhabiting principally the south of the region as far as the basin of the Sette; (3) the Pongo, of the estuary of the Gaboon, with whom are connected the Orongu of Cape Lopez and the negroes of Camma; (4) the Benga of Corisco and the neighbouring coasts, with whom should be classed the Okota, the Okanda, the Apindji, and four or five other tribes of the Ogowé; (5) the Fans or Pahuin, Osyeba, Chake, &c., forming an anthropophagous group whose migration is recent. The dispersion of these different negro tribes over West Africa (with the exception of the last-named group) has been regular. They have marched in successive bands from the Upper Ogowé, in a southerly or south-westerly direction to the coast, where each succeeding tribe has displaced the preceding one.

Thus the Pygmies have been scattered into various small groups, the Congos have been driven back to the south, while the Pongo and Benga have been dispersed among the invading Bakalai and Pahuin. Dr. Hamy has devoted special study to the fine collection made by M. Joseph Cholet among the tribes of the Ludima and the Niari, and confirms to a great extent Livingstone's conclusions regarding the resemblance of the manners and customs of the blacks of this part of Africa to those of the ancient Egyptians. The Osyeba, who are connected with the Pahuin of Gaboon, are found to have come originally from the banks of the Ivindo, a large affluent on the right bank of the Ogowé. They could not have migrated, as some have supposed, from one of the great equatorial lakes, because they are profoundly ignorant of fishery and navigation. Again, it is not to them but to the Ovambo of the Upper Ogowé that the tools in the form of the beaks of birds (improperly called "tools of sacrifice") are found to belong. The existence among the Pahuin of knives similar to the "puigahs" of the Niam-Niam of the Welle had been taken by Dr. Schweinfurth as indicative of their Oriental origin. The tribes in the neighbourhood of Franceville, viz. the Obambo, Ondumbo, and Ovambo, are the most industrious and intelligent of the whole region. The people inhabiting the French side of the Congo and the banks of its affluents, appear from their industries to bear remarkable resemblance to the natives of the upper basin of the Nile. Certain peculiarities, such as the use of wood as a pillow, would seem to indicate that among the Bobangui immigrants on the Nkundja there are true Ethiopians, as is the case in other parts of Equatorial Africa.

The Source of the Mississippi.—With reference to the recent discovery of a lake source of the Mississippi beyond the old-established Lake Itasca of Schoolcraft, to which Captain Willard Glazier has laid claim,* it is maintained by Mr. Russell Hinman, in an article in the American journal *Science* of the 13th August last, that Captain Glazier's claim is not valid. Mr. Hinman shows by reference to official documents (reproduced in engravings illustrating his paper) that the existence of this smaller lake on one of the five creeks that fall into Lake Itasca was known to Schoolcraft in 1832 and to Nicollet in 1843. Neither of these explorers gave the lakelet a name, but this omission was supplied by the Land Office map of 1879, in which it is named Elk Lake, a name which has priority over "Lake Glazier," given to it by Captain Glazier in 1881. Mr. Hinman has kindly sent us a tracing of the sheet of the Land Office map, marked "Township No. 143 N.;" filed in 1876, in which Elk Lake is carefully laid down.

Alaska: News of Lieut. Schwatka's Expedition.—News has been received from Lieut. Schwatka, who was sent to Alaska in command of

* See 'Proceedings R.G.S.,' 1885, p. 23.

an exploring expedition by the proprietors of the *New York Times*. On the way to Mount St. Elias the party crossed a river, the existence of which had been hitherto unknown. At a distance of eight miles from the mouth it is stated to be a mile in width and its current to flow at the rate of ten miles an hour. The river has been named Jones river. To the east a glacier 20 miles wide was seen by the explorers, which extended for 50 miles along the base of the St. Elias Alps. It was named after Prof. Agassiz. Another glacier to the westward was named after Prof. Guyot. After three days' marching Lieut. Schwatka and his party came upon a third glacier which was named in honour of Prof. Tyndall. From this point they resolved to penetrate as far as they could into the heart of this grand but desolate icy region. At the end of twenty hours' labour they came in sight of the south side of the great mountain to which belongs the icy girdle along which they had been travelling. Glaciers were seen rising, sometimes perpendicularly, to heights varying from 300 to 3000 feet. Enormous crevasses, some as much as 30 feet across, now became frequent. After a great many difficulties had been surmounted, a height of 7200 feet above the snow-line was at last attained. One incident of the journey was the discovery of three peaks, ranging from 8000 feet to 12,000 feet in height, which were severally named after President Cleveland, Mr. Secretary Whitney, and Captain Nicholls. Mr. Seton Karr, who accompanies the expedition, states that the whole region is vastly superior to any other mountainous district with which he is acquainted. Lieutenant Schwatka hopes, by renewing his attempts, to make further contributions to geographical knowledge.

New Geographical Society.—A "Société de Sciences et de Géographie" was formed in Haïti in June last, under the Honorary Presidency of His Excellency General Salomon, President of the Republic. The President of the Society is the Rev. Père Weik, and the Secretary the Marquis de Teano.

Obituary.

W. P. Eduard S. Rüppell, the Nestor of African explorers, is reported to have died at Frankfurt-on-Main, his native town. He was born on November 10th, 1794. Having had the misfortune to lose his parents when at an early age, he was withdrawn from the "gymnasium" in his seventeenth year to receive a commercial training. His weak health compelled him, however, to desist from business, and his private circumstances fortunately enabled him to take up scientific pursuits. In 1816 he went to Italy, where he made a geological survey of Elba, and in the year after he visited Egypt and the Sinai Peninsula. After his return to Europe he took up the studies of astronomy and natural history, at Genoa, the former under Baron von Zach. Thus prepared, he performed two expeditions which must ever occupy a foremost place in the history of geographical exploration. In 1822–28 he visited Kordofan (being the first European who did so), Arabia Petræa, and the Red Sea; in 1831–34 he travelled in Abyssinia. In 1839 the Royal Geographical Society awarded him the Patron's medal in recognition of his discoveries. Most of his collections, including natural history specimens, coins, Ethiopic manuscripts, &c., were presented by Rüppell to the Senckenberg Museum or to the town library of Frankfurt. He published his 'Reisen in Nubien, Kordofan, und dem Peträischen Arabien' at Frankfurt in 1829, with a Zoological Atlas (1826–30); his 'Reise in Abyssinien' in 1838–40; 'Systematische Uebersicht der Vögel Nord- und Ostafrikas' in 1845; 'Neue Wirbelthiere zur Fauna Abyssiniens' in 1835–40; and several minor works or papers.

Eduard Robert Flegel.—The death of this persevering explorer of the Niger-Benue basin is reported from Brass Town. Flegel began his career as purser on board a Liverpool steamer trading to Africa. In 1875 he settled at Lagos, and in 1879 he availed himself of an opportunity afforded him by the agents of the Church Missionary Society to accompany the *Henry Venn*, in which he visited the Cameroons, where he ascended the peak in the company of Mr. Kirk, and afterwards the Upper Benue. His excellent map of that river published in the 'Proceedings' of the Royal Geographical Society (1880, p. 336) directed towards him the attention of the German African Association, who, in 1880, voted him 200*l.* towards the expenses of a more ambitious expedition, which was to complete our knowledge of the basins of the Benue and of Lake Chad. Flegel ascended the Niger to Gomba in lat. 11° 30′ N., where he arrived on December 11th, 1880, and thence travelled to Sokoto by land. Having obtained the permission of the Sultan to travel in Adamawa, he proceeded by routes not hitherto explored to Yola, and on August 17th, 1882, he discovered the source of the Benue. Early in 1885 he returned to Europe, when the African Association entrusted him with the conduct of a scientific expedition, and instructed him to establish two stations, one on the Benue, the other to the south of that river, which might serve as bases for exploring the country between the Benue and the Cameroons. The expedition left Brass on May 22nd, 1885. Herr Flegel, in the letters published in the 'Mitteilungen' of the African Association, speaks of the obstacles which were placed in his way by officials of the National African Company, who looked upon him as a commercial agent, desirous of diverting a portion of the Niger trade into the hands of a Hamburg syndicate which it was alleged he represented. He was refused admission into Yola, but succeeded in September of last year in founding a station at Bakundi on the Tarabba, a southern tributary of the Benue. The geographical work accomplished by Herr Flegel is of high value. A full report of his explorations since 1882

still remains to be published. The only separate works which he wrote are 'Lose Blätter aus dem Tagebuche meiner Haussa-Freunde und Reisegefährten,' and 'Drei Briefe an die Freunde deutscher Afrikaforschung,' both published at Hamburg in 1885.

Paul Soleillet.—The death of this active French African traveller is reported from Aden. Paul Soleillet was a native of Nîmes, where he was born in April 1842. He began his career as a traveller in 1865, in Algeria, Tunis, and Tripoli. In 1871 and in 1873 he explored a portion of the Algerian Sahara, but failed to reach Tuat. Since that time he became one of the most indefatigable agitators in favour of connecting Algeria with Timbuktu and the Senegal by a Sahara railway, and thus laying the foundations of a French African Indies. His attempts to reach Timbuktu from the Lower Senegal, in 1878, 1879–80, and 1880 failed. In 1881 M. Albert Godin, of Havre, entrusted him with a commercial mission to Tajura Bay and Shoa, where the king showed him much favour, and granted him large tracts of land, as also a concession for building a railway to the Gulf of Aden. After a visit to Kafa, M. Soleillet returned to Europe, in 1884, only to return soon afterwards to Shoa. Besides numerous articles in French geographical papers, M. Soleillet published 'L'Avenir de la France en Afrique' (Paris, 1875); 'L'Afrique Occidentale' (Paris, 1877); and 'Voyages en Éthiopie' (Rouen, 1885).

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

BIRMINGHAM MEETING, 1886.

THE meeting of the British Association was held this year at Birmingham, commencing on the 1st September. The Geographical Section was constituted as follows:—

PRESIDENT.—Major-General Sir F. J. Goldsmid, K.C.S.I., C.B.

VICE-PRESIDENTS.—H. W. Bates, F.R.S.; Admiral Sir E. Ommanney, C.B., F.R.S.; Major-General Sir Lewis Pelly, K.C.B., M.P.; Colonel Sir Lambert Playfair, K.C M.G.; General J. T. Walker, C.B., F.R.S.; Captain W. J. L. Wharton, R.N., F.R.S.; Colonel Sir Charles Wilson, R.E., K.C.B.

SECRETARIES.—F. T. S. Houghton, M.A.; J. S. Keltie; E. G. Ravenstein (*Recorder*).

COMMITTEE.—W. Morris Beaufort; R. Capper; Rev. Canon Carver, D.D.; R. W Felkin, M.D.; Douglas W. Freshfield, M.A.; Sir Julius von Haast, K.C.M.G., F.R.S.; R. G. Hobbes; C. E. Mathews; Rev. E. F. M. MacCarthy, M.A.; Professor John Macoun, M.A.; E. Delmar Morgan; John Murray, F.R.S.; John Rae, M.D., F.R.S.; Sir Rawson W. Rawson, C.B., K.C.M.G.; General F. H. Rundall, R.E.; Trelawney Saunders; General R. Strachey, R.E., F.R.S.; General Sir Henry Thuillier, C.S.I., F.R S.; Joseph Thomson; Canon H. B. Tristram, F.R.S.; A. Silva White.

The meetings of the Section took place in a spacious class-room of the School of Arts, and were for the most part well attended. Mr. Douglas Freshfield's paper (on Friday, the 3rd September) on Geographical Education, led up to an instructive discussion. The Royal Geographical

Society's Exhibition of Educational Appliances was excellently displayed in the basement of the same building, and attracted numerous visitors.

Altogether twenty-nine papers were read, including nine on Africa, five on Asia, and six on America.

Thursday, September 2nd.

The PRESIDENT opened the business of the Section with an address. After a few opening remarks he proceeded as follows:—

As to the subject of my opening address, I know none more befitting the occasion than the means of popularising the branch of science to which the meetings in this Section will be devoted, and thus attracting towards it that attention which it merits —nay which, in this our country if anywhere, it demands and necessitates.

The question is a wide one, but I will endeavour to narrow the field of its discussion to suit our purpose of to-day, and keep within reasonable limits. A few words will suffice to lay before you the programme. It embraces: first, the uses of geography, an exposition of which should prove, and a due apprehension of which should admit, the necessity of its inclusion among the special studies of public schools; secondly, the mode of imparting a knowledge of geography so as to render it at once practical and engaging; and finally, such illustrations of modern travel and research as may serve to demonstrate how urgent is the study of geography to all classes in this country. . . .

To begin then with the uses of geography. There are doubtless many who will say demonstration here is superfluous, and that if its use was not admitted it would find no place in school studies, which is contrary to fact in many instances; there would be no primers or elementary works on the subject, whereas they may be reckoned by the score; books of travel would be rather entertaining than instructive, a charge which many recently published volumes would disprove; and so forth.

Some again will argue that its uses, such as they are, must be restricted to the few specialists who aspire to be geographers, and that for the million it is enough to carry about a rough idea of the four quarters of the globe, the principal countries and capitals in them, and a sufficient amount of preliminary instruction to understand Bradshaw and Baedeker. A third, and perhaps the largest category among educated people, consists of those who are indifferent to the whole question, and are content to find in geography either an honoured branch of science or a mere nominal study, according to the views of the latest speaker or most plausible reasoner. If it be allowable to apply things holy to things profane, no truer illustration of this class can be given than the Scriptural definition of men who receive seed "in stony places."

To the first of the above I would say that the place which geography holds among school studies is not that which it ought to hold if its uses were understood and appreciated. Primers and elementary books already published are good enough in their way, but the instruction they contain is not seriously imparted; and it may be that something fitter and more attractive to the beginner could be produced. At present all school-books on geography may be said, as a rule, to be consigned to the shelf of secondary subjects; and this is not the treatment which should be reserved for a study of such real magnitude. By and by it will be my endeavour to establish by argument and example the indisputable character of its importance.

For those who look upon geography as a profession which needs rather separate training than general education, and would prefer to leave its acquirement to travellers aiming at distinction, specialists in Government employ, and the more zealous and scientific Fellows of the Royal or any other geographical society, I

can only express my regret that the delusion under which they lie unfits them so thoroughly to understand and much less satisfy the wants of a rising generation. By denying the universal character of the study they clearly misapprehend its true scope, and are dwarfing it to within the narrow limits of a conventional school task.

As a matter of State or public school education the science of geography should in truth be elevated, not degraded. In my humble opinion it should be placed on a par with classics, mathematics, and history, with each and all of which it has affinity. Undoubtedly there are accomplishments which come, as it were, of themselves, or are the outcome of lightly-sown seeds in the home. These for the most part are rather mechanical than mental, though some may have advocates to claim for them intellectual honour. But a knowledge of geography is not to be so acquired: it will not come, like handwriting, with incidental practice, nor is it to be gained by mere travelling. To move from place to place, whether across seas or continents, or both, to go round the globe itself and visit every important country and capital in the track chosen, even to prefer byways to railways and search into obscure and hidden spots rather than those which are more generally frequented—all this process affords admirable matter for the note-book of the man of the world and observer, but will not educate in geography, unless the student himself has a serious purpose to turn his wanderings to the account of science. The cursory description which would apply to men and women, cattle and conveyances, hotels and caravansaries, restaurants, coffee-houses, and the like, in a moving panorama, is not always suited to bring out in bold relief the physical aspects of a country.

To the indifferent and wavering, to those who would wish to promote the study of geography if they could feel persuaded that it needs promotion, but who would leave to the better judgment and experience of others the decision on the whole question; to those who are content to accept the institution of a professional chair in honour to the science, or to leave geographical study to the primitive teaching of their own childhood, whichever course be most in accordance with the temper or fashion of the times—I can perhaps do no better than appeal on the grounds of urgency—in other words, of the real importance of the cause for which, in common with abler and worthier advocates, I would now most earnestly plead. The opening verse of the Bible, in imparting to us the first great act of creation, at once establishes the high position among the lessons to be taught mankind of astronomy and geography; and the description of the garden of Eden and the river dividing into four heads—two of which, the Hiddekel and the Euphrates, still mingle their waters in one, after a long separate course from the highlands of Armenia—is an illustration of pure geography conspicuous in the second chapter, immediately following the story of man's formation. To say that there is a special fascination in Biblical research, whether geographical or archæological, is to say what those alone know who have made such studies a labour of love as well as a part of duty. But those who *do* know this truth from experience are ready to assert it without reservation. I have myself heard the assertion from the lips of one of the most zealous and industrious contributors to Smith's 'Dictionary of the Bible'—one whose versatile talent and comprehensive intelligence have now called him to a different sphere of usefulness, but who is no less a sure and competent witness. And is there no fascination in contemplating the marvellous fact I have just cited? For assuredly it *is* a marvel that for nearly 6000 years, or, so far as we can tell, from the creation of the world itself in which we live, and the bestowal of names upon things animate and inanimate up to the present day, we find two ancient rivers retaining their names unchanged—Euphrates and Hiddekel. There is no need to speculate here on the Aryan origin attributed to the first, nor upon any broader meaning implied by the latter. I can myself answer for the local name "Farát" or "Al-farát," and

"Digla" or "Dagla" (with the article, Al-dagla, Addagal, Addigal) in use between Baghdad and the Persian Gulf.

In touching upon Biblical research, I may be told that—according to hard thinkers at the present hour—I am taking a sentimental view of an argument which should be mainly practical. But the geography of Mesopotamia, as of Palestine, is to all intents and purposes a practical study, especially in these days of possible railways and new lines of intercommunication east and west; now, too, that Cyprus is ours, and the immense advantages of its occupation have been demonstrated by time and experience. Moreover, if any geography can be considered Biblical, it is that of Asiatic Turkey, both as regards the New Testament and the Old.

I am not, however, going to dwell upon this highest view of the subject. The connection of geography with Holy Writ is self-evident, and the twenty-one years' history of the Palestine Exploration Fund, only just written, affords an admirable instance how public interest may be aroused to support, and individual energy and intelligence may be exercised to prosecute, a work hallowed by association. . . .

Turning to secular things, I almost seem to be treading upon the threshold of platitudes when seeking to explain why geography should be useful to young men of ordinary culture, for whatever career they may be destined. In some cases it is naturally more urgent as a study than in others. The military man, for example, should be more or less a scientific geographer. His profession may require him to survey and describe new regions; and a campaign over a beaten track should find him acquainted with the minute topography and physical aspect of places, at least the names of which are familiar household words. The sailor should in like manner bear in mind the configuration and character of sea-coasts, and carry about the land-marks of his own observation as well as those to which he may refer in books. To both must geography be eminently a professional study. But, considering the enormous extent of our Indian Empire and Colonies, and the many foreign States with which we must have intimate relations, is any Englishman, I would ask, competent to discuss, much less to serve, the interests of his country who knows nothing of the physical features, resources, products, population, and statistics of these? It seems to me to be the duty of every loyal subject and citizen, high or low, rich or poor, to seek information on these heads wherever it may be obtained.

But of all men who should realise geography in its broad, comprehensive sense—both as an aid to history and as a science to which history may be subordinate—first in order is the statesman in whose province falls the disposal and partitions of countries or regions. What should we say of the Judge—we may be thankful there are none such on the English bench—who not only gave his decision without mastering the merits of the case before him, but who was also ignorant of the law and precedents which should guide him in the treatment of those merits? The argument might apply with equal force to other callings from the members of which professional opinions or decrees are required by their fellow-men. Why, the evil would be so great and so palpable that its existence would not be tolerated for a single day; and the only reason why it *is* allowed to prevail in matters geographical is that though equally great in respect of these, it is not equally palpable. The statesman may not know the situation of this or that particular place, nor its products and resources, but neither does the public. One is not taught geography any more than the other; so that while ignorance and error are brought to bear on a spurious judgment, the critic is not in a position to point out the real flaw, and the blunderer escapes the scathing condemnation which would otherwise await him in the columns of the morning paper.

Let us suppose a case by way of illustration—a case which conveys no exaggerated idea of what happens, or may happen, in the course of a year—a case which,

without being an actual occurrence, has in it the flavour of actual occurrences. There is a large tract of land in the far West or far East, it matters not which. All that is known about it is that it is called Laputa or Barataria, and that it is situated in the central part of a region or continent so vast that it might be reasonably called the largest quarter of the globe. Well: it is encroached upon by a powerful neighbour, and England requires the preservation of that land's integrity and independence. Her best instructors on the matter have told her that such is her interest, and she believes them. Intervention, therefore, becomes necessary; negotiations ensue; and the whole question resolves itself into a partition of territory and demarcation of boundary—in other words, the question becomes one of geography—what I should call, for reasons to be explained hereafter—Political Geography. Who, if not the ruling statesman, should know the true principle on which to deal with a large settlement of this nature—one, it may be, involving ethnological, commercial, humanitarian quite as much as territorial considerations? Who, if not the agent on the spot, should know the details to regulate the application of the principle? But the statesman should be in full possession of his agent's details, and be capable of appreciating them not only from the latest reports supplied, but from a certain insight into the matter obtained from early study. He should have been coached in that comprehensive kind of geography which would have embraced the particular information required. Under present arrangements it is not so. The geography taught at schools is too simple or too scientific—too complex or too superficial; in any case, it is not the geography which would benefit the cabinet minister in solving a territorial difficulty any more than would those "ingenuæ artes" which have so strong a civilising influence on the natural man. Experience in classics may forestall the faulty quotation and false quantity, but fail to suspend the false move on the political board. And it need not be said that while the first, in point of fact, affects the speaker only, the last concerns the happiness of the million.

We now reach the second consideration: the mode of imparting a knowledge of geography so as to render it at once practical and engaging; and I may be pardoned if I dwell upon this somewhat lengthily, for it involves the gist of the whole question before us. It is always easier to detect a flaw than to find a remedy, and in the present case the flaw is generally admitted by experts. There may be differences of opinion on its character and extent, but apparently there are none on its existence. I shall have to recur to the first, but would ask leave to dismiss the last as established. We are told on excellent authority that in our own country the elements of success in geography are wanting, and the conclusion has been practically accepted by the representative Society for this branch of knowledge. The remedy has been suggested, and in a certain sense partially applied, but a great deal more remains to be done, and the many views entertained and expressed by competent men on the claims and requirements of geography in England render necessary a short review of what may be called the "situation," including notice of work achieved in the direction of reform.

In the first place let us examine into the work done and doing by the Royal Geographical Society. What the objects of this Society are, and what have been its operations for half a century, may be gathered by a perusal of Mr. Clements Markham's interesting record published on the occasion of its completing the fiftieth year of its existence on July 16, 1880. I quote two passages which bear upon our present lines of thought. One recites the propositions "unanimously accepted as true and sound," which are in truth the basis on which this now flourishing institution was originally formed. They are thus expressed:—

"That a Society was needed whose sole object should be the promotion and

diffusion of that most important and entertaining branch of knowledge, geography; and that a useful Society might therefore be formed under the name of the Geographical Society of London; that the interest excited by this department of science is universally felt, that its advantages are of the first importance to mankind in general, and paramount to the welfare of a maritime nation like Great Britain, with its numerous and extensive foreign possessions; that its decided utility in conferring just and distinct notions of the physical and political relations of our globe must be obvious to every one, and is the more enhanced by this species of knowledge being obtainable without much difficulty, while at the same time it affords a copious source of rational amusement, and finally that, although there is a vast store of geographical information existing in Great Britain, yet it is so scattered and dispersed, either in large books that are not generally accessible, or in the bureaus of public departments, or in the possession of private individuals, as to be nearly unavailable to the public." . . .

The second passage from Mr. Markham's report is the author's own estimate of geographical work—an estimate supported by a wide and varied personal experience:—

"Geography is a progressive science. Every year, with its discoveries and novelties, also brings forth a large crop of corrections and of information which modifies preconceived theories and opinions. It is this freshness, this constant supply of new material, which constitutes one of the many charms of geographical research." *

Let us add a hope that when its real scope becomes known and its uses more patent to our masters in education, efficient advocates will not be wanting to secure its acknowledgment in England as a study of absolute necessity.

Of late years the Royal Geographical Society, in pursuance of its originally expressed aims and objects, and strong in the experience of a long and prosperous career, has endeavoured to arouse the rising generation to a sense of their shortcomings as regards the particular science in the promotion of which it has its own *raison d'être*. It granted prizes to such public schools as chose to compete for them, and after sixteen years' trial discontinued the grant, owing to unsatisfactory results. It opened correspondence with schools and colleges, and made other judicious and laudable attempts to evoke sympathy and support. But all its proceedings have been as it were preliminary, and may be considered rather as foundation-stones of a temple of success than the outer walls or any visible part of the building itself. A more recent attempt to reach the masses was the Exhibition of Educational Appliances. Objects used in geographical instruction at home and abroad were collected and arranged in galleries hired for the occasion, and the public were invited to inspect them. At the same time appropriate lectures were periodically delivered, by competent and experienced men, to the visitors, many of whom were not merely interested amateurs, but persons actually engaged in school teaching. Attention was called to the fact that the exhibition was purely educational; that there were in it specimens of German, Austrian, and Swiss maps, executed with a finish and detail unusual in our school maps at home; but that as the Society's inquiry embraced universities as well as schools, part of the appliances exhibited were used in Continental universities, though in reality some of the finest maps shown were found also in the higher schools of Germany and Austria.† Besides maps, there were in the collection globes, models, and text-books, the presentations

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* 'The Fifty Years' Work of the Royal Geographical Society,' by Clements R. Markham, C.B. (Murray, 1881), pp. 19, 126.

† See Preface to Catalogue of Exhibition.

not being confined to countries visited by the inspector, to whom the task of collection had been entrusted, but from others also; and these were further supplemented by contributions from British publishers.

The result of this new departure—if the term be allowable—was pronounced very satisfactory, and at the close of the exhibition, or in the spring of the present year, the Council considered what would be the next best step to take in furtherance of their desire to raise the character of geographical study. At a later date, on the recommendation of their Educational Committee, they resolved on addressing the universities to the effect that chairs or readerships be instituted similar to those which were at that time filled in Germany by Carl Ritter at Berlin, and Professor Peschel and Richthofen at Leipsic. In carrying out the resolution alternative schemes were submitted. The Council would appoint, under approval of the university authorities, a lecturer or reader in geography, paid out of the Society's funds, he being accorded a fitting local status; or each university might join with the Council in the matter of payment, and a reader be appointed by a committee in which the Society should be represented.

Thus far I have referred to the proceedings of the Royal Geographical Society, and I think you will allow to those responsible for them the credit of moving in the right direction, with a genuine desire to promote a good cause. But the new Geographical Societies have not been idle; Edinburgh and Manchester have shown an intelligent vigour in seeking to popularise the study of geography, and much has been done in both places within the past few months only, which is worthy of permanent record. Of Manchester I can speak with a certain amount of personal knowledge, having read two papers there, and had the advantage of making the acquaintance of the more prominent members of the Society. The movement in a great commercial city such as this may well aid in strengthening the hands of the London Society; for nothing could more faithfully demonstrate the practical uses of the science under consideration than the fact that it had a centre in Manchester. As to the nature of the recent work there, I need refer only to the Exhibition of Geographical Appliances which followed that in London—arranged by the mayor at an art gallery lent for the purpose. We are told in the published reports that space could not be found for showing all the specimens sent, but that a selection was made, and that maps were the main feature. These were of many countries—English, German, Dutch, French, Italian, Norwegian, Swedish, Russian, American, and Canadian—among the Norwegian being a fine series presented to the Manchester Society by the Royal Institute of Christiania. During the exhibition, seventeen addresses were delivered in the building on subjects connected with geographical education. Every day lectures were given of about three-quarters of an hour each, on the contents of the rooms, to audiences ranging from ten to a hundred and fifty persons. The special Education Committee, appointed with reference to the Exhibition of Geographical Educational Appliances, were enabled, at the close of their work, to report to the Council that in their opinion the object of the Society had been accomplished, and expressed a hope that the impression produced might not be allowed to evaporate, but should rather be "fostered to more definite results in this extensive branch of human knowledge." From Manchester, the London Society's collection of Geographical Appliances was transferred to Edinburgh, where an address was delivered by Mr. Ravenstein at the opening meeting in the Museum on the 14th of June.

It will thus be seen that special efforts have been made and continue to be made to popularise a science which has never, so far as can be ascertained, held its proper place in the educational programme of our schools or universities. We must not, however, lose sight of one important consideration. More remains to be done

than to institute a chair, a professorship, a readership. It must be clearly understood on what general lines of study we are about to proceed. Is geography to be taught in its full, comprehensive sense as something involving a knowledge, more or less, of mathematics and astronomy, of ancient and modern history, of ethnology, zoology, botany, geology, of men and manners, laws of nations, modes of government, statistics, and politics, something requiring in the disciple a quick ear, a searching eye, an appreciation of scenery and outer subjects as well as physical aspects of country, a power of picturesque but an adherence to accurate description? If so—and I believe I have only stated the qualifications of the travelled and finished geographer—would it not be well to inquire whether the component parts of the science should not be reconsidered, and a subdivision effected which would make it easier to deal with than geography as now understood, under the terms physical, political, and perhaps commercial?

It must be borne in mind that our governments or geographical societies, our boards or our universities—whichever distinguished body takes the matter in hand, separately, it may be, or in concert—will have to cater for a multitude of pupils, and that, whatever change eventually takes place in programmes of study, the division of school teaching into two great representative branches, classics and mathematics, is a practice which has hitherto, at most public schools, resisted the shock of innovation. The maintenance of this time-honoured custom is not so much, to my mind, an illustration of conservative principle—*that*, we all know, is powerless against national progress—as the assertion of a profound truth, similar to that which in the region of language separates the Semitic from the Aryan category of tongues. It is a recognition of the distinction which exists in the human organisation between mind and mind—a distinction apparent in the boy as in the man, at school as at college—in the battle of life itself as in the period of preparation for battle. I do not mean to imply that all school studies fall essentially under one or other of these divisions; but I do believe that the student's progress will be in accordance with his idiosyncrasies; that the student's taste should be considered in the master's system; and that, in dealing with geography, we ought not to throw it wholesale into the hands of the professor or reader, but, as a primary measure, separate it to suit the capacity of the classical as of the mathematical intelligence, so that the one part comes within the province of history and art, the other within the limits of unadulterated science. Attention to both sections should be imperative, so far as attention to classics and mathematics is imperative, but the standard of competence attained in either must depend on the mind and bent of the pupil, who might readily excel in one but fall short in the other, not being even distinguished if the subject of study were undivided.

Not six months ago I wrote as follows:—"We are authoritatively told that, at one of our greatest public schools, which may be fairly taken as representative of its class, there is no systematic teaching of geography at all, but 'that in the history lessons, as well as in the classical lessons, a certain amount of geography is introduced incidentally.' Again, if we look at the universities abroad, it has been found the custom, until quite lately, both in France and Germany, to combine the chairs of geography and history under one professor. Now the 'incidental' character of geographical instruction is a tacit declaration of its unimportance, which every day's experience shows to be without warrant; and its combination with history may be an expedient to render it less distasteful than it appears as a separate study. But a useful hint may be taken from the Continental practice, and a partial fusion of two departments effected, which would commend itself to common sense, and to judge from the recorded opinions of certain of our educational experts, might not be objected to by head-masters in England collectively. Let us, then,

endeavour to extract from the lessons of conventional geography that part which is inseparable from the study of nations and people, and place it under a new and more appropriate head. In this view, so-called 'political geography,' stripped of its purely scientific belongings, would be taught in connection with history, and made an essential ingredient in the early training of British statesmen, whose after-reputation should be more or less the outcome of a university career, the grounding of a public or grammar school, or private tuition. It is difficult to reconcile the amalgamation of what may be considered 'scientific' geography with history. One is as thoroughly apart from the other as geology is from astronomy." *

The meaning of the verbal combination "political geography" requires some kind of analysis. Conventionally, and in an educational sense, it is the description of the political or arbitrary divisions and limits of empires, kingdoms, and states; their inhabitants, towns, natural productions, agriculture, manufactures, and commerce, as well as laws, modes of government and social organisation—everything being viewed with reference to the artificial divisions and works made by man. Accepting this interpretation of its objects, who can hesitate to admit its palpable and immediate relation to history? The mathematical science which investigates the physical character of territory and territorial boundaries is in this case but a secondary requirement and can be always fairly disposed of in the recognition of results. Otherwise, we have simply commercial geography with ethnography, and considerations which we may call political in the present, but which are undoubtedly historical in the past. Surely, then, it would be wise and reasonable to combine the studies of history and political geography—putting a wider interpretation than the conventional one upon the latter designation in such a manner that the two together should be just the sort of *pabulum* dispensed to the rising generation of statesmen, diplomatists, and all who aspire to the name of politician, in its higher sense of capability to promote as well as to discuss the national welfare.

An admirable lecture on "Geography in its Relation to History" was delivered by Mr. James Bryce—the late Under Secretary for Foreign Affairs—in connection with the recent London Exhibition of Geographical Appliances. Those who are acquainted with it will readily understand why I pause to remark on its enlightened teaching; to those who have not that advantage I would explain that it seems to embody the arguments of Modern Thought on the important question we are now considering, and that a brief allusion to it is therefore no irrelevant introduction here. The lecturer, seeking to demonstrate that history and geography touch one another in certain relations and interests, laid down the proposition that man is, in history, more or less "the creature of his environment"; that "on one side, at all events, he is largely determined and influenced by the environment of nature"; and that, "it is in discovering the different effects produced on the growth of man as a political and State-forming creature by the geographical surroundings in which he is placed" that one point of contact is found. He, moreover, maintained that man, "although he may lift himself above his environment, cannot altogether escape from its power." Dividing the influences thus exercised into three classes, he showed that those arising from the configuration of the earth's surface affected movements of races, intercommunications, and barriers of separation; that those belonging to climate affected the occupation or abandonment of particular localities on the score of health, fertility, or non-fertility of soil, and consequently commerce and cultivation; and that those which owed their existence to natural products unmistakably directed the energies of peasantry and people into certain fixed

* 'Asiatic Quarterly Review,' April 1886: "The Political Geography of Asia."

channels of enterprise—a result which applies to the zoology as well as to the mineral and agricultural resources of a country. He made the very true observation that the "animals affect man in his early state in respect to the enemies he has to face, in respect to his power of living by the chase, in respect to the clothing which their furs and skins offer to him, and in respect to the use he is enabled to make of them as beasts of burden or of food"; and he therefore concluded that "zoology comes to form a very important part of the environment out of which historical man springs." A volume might well be written on this suggestive theme alone; and if, as I believe, the proposition of a human being's dependence on environment be admissible in its entirety, what a field of speculation is open to the inquirer! A condition held applicable to the unreckoned millions of to-day must have had a marvellous effect in giving character to original Man!

This conception of man's environment supposed heads or branches of geography all bearing upon history, which might be distinguished by names such as ethnological, sanitary, commercial, linguistic, political and military, legal—the last leading to the consideration of the Suez Canal and sea-channels, in which several States have interests. As time, however, will not allow me to quote the lecturer's apt and well-put illustrations which followed, I may mention that the express object with which they were introduced was to show how "the possession of geographical knowledge, and a full grasp of the geographical conditions," with regard to some of the leading countries of the world, "will enable a person studying their history to make the history more intelligible and real." In strict conformity with this opinion, and in the conviction that the want of geographical knowledge and "full grasp" of geographical conditions will betray men in power to commit dangerous mistakes, calculated to injure the national prestige and credit, and men out of power to become their upholders in error, I would express the hope that, in any future arrangements which may be perfected for the better education of our countrymen, while physical and scientific geography are invested with a degree of prominence and honour to which they have hitherto never attained, that branch of study which we have been accustomed to call political, will be reconsidered and, if necessary, newly defined by competent men. The conclusion at which I have myself arrived —one which I am quite ready to abandon before the arguments of sounder reason— is that we have here something which belongs mainly to history, and, in such light, its scientific should be separated from its non-scientific elements. A partition should be made which would equally suit the mind of the student whose tendencies are rather towards metaphysics than mathematics, as of him who is a votary of practical science only. I do not presume to touch upon the action of universities, except to say that I can conceive no better example could be afforded that the intellect of England had due regard for the material interests of England, than by the creation of a chair for scientific geography and the relegation of that which is non-scientific to the chair of history. I now turn to the third, or illustrative portion of the subject under discussion.

To illustrate, by instances of modern travel and research, the urgency of geographical study to young Englishmen, especially those who from adventitious position, ambition, or ability are likely to hold the helm in any department of State, I see no fitter way than, by a retrospect of the work done, to come to the conclusion whether we, as a nation, would have participated more directly in that work, or derived more legitimate benefit from it, had we been better instructed. Now this is a delicate question to put, if applied to particular cases, because it involves matters of policy, and belongs to the domain of pure politics rather than to any form of political geography; but I shall not presume to ask whether we could, or could not, have acted more wisely in this or that diplomatic difficulty, only

whether the solution of such a difficulty does not, in point of fact, depend upon a geographical experience which we do not always possess, and cannot always command from others. Having explained upon what particular instances of progress in the field of exploration or discovery I should dwell, at this stage of my address, I will now speak more definitely. Though my own personal experience of travel has been obtained, more or less, in the four quarters of the globe, I cannot but feel that Europe is more familiar to me in its chief cities and highways, and more popular social haunts, for the geography of which there is no demand—notwithstanding abundant and choice material—than as a subject for scientific description. So also with the United States. New York and Philadelphia, and the Hudson River, with all their recommendations, have certainly no gloss of novelty, and my personal knowledge is unfortunately restricted to these points. In Asia, I have a wider field—from the Canton River to the Bosphorus—but for obvious reasons a corner of this will suffice for present purposes. In Africa I have made quite recent acquaintance with the Congo—that great river whose introduction into our maps in its entirety is one of the most notable of geographical feats of modern times. My experience of it was brief and confined to its lower section, but the two months passed at Vivi and between Banana and Isanghila were not without instructive use. Plainly, then, after a retrospect of work lately achieved by travellers and explorers, I will limit such comments as I may have to offer to the Congo for Africa, and Eastern Persia for Asia.

(After a brief mention of the principal geographical explorations of the past year, the President continued:—)

With one exception I omit all reference to "projected" expeditions, of which the number is unusually great.

The exception will be disposed of in very few words. It relates, perhaps, rather to a mooted subject than to a new project, the research of the Antarctic Polar Seas, on which a paper was read last year at the Aberdeen Meeting by Admiral Sir Erasmus Ommanney. Men's minds are so fully occupied at the present hour with the thousand and one practical interests which arise like sparks out of the fast-rolling wheel of Progress, that the theory of an unknown polar region may not possess the fascination which it exercised in days when steam power had been less developed, and electricity had not exhibited a tenth part of its now familiar uses and effects. Nevertheless, there is something to stir the imagination, even of this unimaginative age, in the theory of a South Polar Sea; and there is something practical in the proposition besides, for it tends to give substance and meaning to the unknown. If the object of exploring that comparatively neglected corner of the globe commend itself, as I know it does to many, assuredly the project opens a worthy field of enterprise for this nation above all others. The perils may be, as stated on good authority, far greater than those of the Arctic Seas, but the conditions of the two poles greatly differ, and it is most desirable to find such a winter quarter within the Antarctic Circle as has never yet come within the experience of any human being. Those interested in this important question may remember that a Committee was appointed to report upon the advantages to be derived from further exploration of the immense region referred to—near which, some fifty years ago, James Ross made his famous discoveries. Hitherto, for reasons which might readily be explained, no report has been issued; and perhaps the wiser and better preliminary step towards bringing matters to a successful issue would be to expand and strengthen the Committee by the accession of influential members. I now leave the subject in the hands of experts, who alone are qualified to deal with it in detail.

To return from this brief digression. There are two regions in which geographical activity has been evinced in a remarkable degree: both are in that large continent

which one who knows it as well as any living man has qualified as "dark"—the east and west coasts of Africa. It is really astonishing to trace the changes in a map of Africa during the last quarter of a century. Large spaces that were quite blank have been filled up with conspicuous delineations of mountains—fine lines representing rivers, crossed by or connected with finer lines of affluents or feeders—with names, circles, and dots for towns or villages. Yet as I now contemplate that map in its latest form, it seems to me that hundreds of spots visited have yet to be indicated, and that the coast-lines of the Indian Ocean on the one side and the Atlantic on the other, are teeming with life imported, as it were, from Europe. Singly or collectively, emissaries and missionaries—would-be settlers or mere explorers—the number of these now in movement foretells in the course of time a change in the political divisions of the country, whatever the result for good or evil. For the sake of argument let us take the whole extent from 20° N. to 30° S., leaving out Morocco, Algeria, Tunis, Tripoli, and Egypt, as political considerations more or less understood in England. On the west, Germany has stepped in to hoist the flag of colonial power, and is to be recognised at the Cameroons. France has possessions and protectorates between Senegal and the mouths of the Niger, which promise development and consolidations such as it is now impossible to estimate. Below the Gold Coast she has just added to the Gaboon, by agreement with the Belgian-African International Association, an amount of territory which gives her in place of a comparatively small settlement, a continuous coast-line of more than 350 miles, touching inland a great portion of the right bank of the Congo. Those who would know how her agents work for her have only to read the narrative in the publications of her Government, her geographical society, or the records of her missionary fathers. They will there learn that if her soldiers find active service in Senegal, the Pères du Saint Esprit are not slack in peaceful attempt to educate and civilise the natives of the Gaboon. Spain and Portugal have also possessions which have been lately extended on the seaboard of West Africa; and the international partition effected at Berlin has confirmed to the latter her right to lands which had been denied on more than one distinct occasion during the last half-century. . . . For the east coast, again, Germany has annexed territory in the neighbourhood of the Sultan of Zanzibar. . . .

This drawing within the pale of civilisation of semi-barbarous States, this inclusion among common things of the uncommon and strange by the independent or joint action of individual agents, is a matter which cannot fail to arouse a deep interest in those European Powers whose position is secured, or prestige enhanced, by the maintenance of empires, kingdoms, or colonies beyond the seas, over and above their home possessions. It has been seen that France and Germany have marked their sense of the situation by fresh annexations. The first, it is true, has made her West African gains a mere supplement to the more palpable advantages obtained under treaty with Madagascar and Annam; but M. de Brazza's exertions on her behalf have won the important line of the Ogowé river—the additional territory on the seaboard, to which we have referred, being a bargain of comparatively trivial cost. England, in the meanwhile, has refrained from active interference, further than reserving for herself certain rights connected with the Niger and Gold Coast, and entering into treaty with Portugal in respect to the Lower Congo. The reservation was a political fact, to which we need not do more than allude; but the treaty calls for a word of remark. It was never ratified, and fell through in embryo. I do not say that a knowledge of Africa better and more comprehensive than that usually taught in English schools would have averted this result; but I do say that to treat so important a question, a knowledge of geography, such as that which I would combine with history, would have been the best protective weapon. That

low and uninviting mouth of the Congo—that unhappy birthplace of mangroves and of malaria—that much desired and yet most undesirable site of a few European factories, with enterprising but fever-stricken tenants—has a story of its own; and only those who know that story, in its geographical, ethnological, commercial, and political bearings can understand why it is coveted by this or that European Power, and consequently what view England, when appealed to, should take regarding its disposal. All is now over; the Congo has been divided out under the Congress of Berlin.

From West Africa we turn to the East—to countries west of the northern frontier of India.

Three of these merit our serious attention, i. e. Afghanistan, Baluchistan, and Persia, more particularly their history and geography, and full information on them is available in books. Nowhere is this to be found in the comprehensive form that would necessarily be adopted were geography honoured with professorial chairs; but in the absence of the appropriate manual, search must be made in encyclopædias, gazetteers, and volumes of history and travel. Afghanistan has been of late years so much the subject of official correspondence that the blue-book is perhaps as useful a record as any other from which to draw the more important details on the character of the country and people. Baluchistan has a divided history. Her eastern half, contiguous to, and immediately connected with British India, is to all intents and purposes under the protection of that empire; her western half, till within the last fifteen years encroached upon by Persia, is equally amenable to our influence, and should profit from English advice and help. Persia is never in lack of European travellers who delight to place on record their experiences of a country which with all its drawbacks has the immense advantages of grand associations and a charming climate. Nor are its people the effete race that some would suppose. Many of them, whether in the higher, middle, or peasant class, are endowed with energy and activity which need but occasion to draw out; and if cruelty on the part of governors, and extortion and peculation on the part of high officials are painfully recognised native qualities, there is great kindliness and hospitality shown to strangers by the same classes, and, let me add, the love of poetry is universal. . . .

And now let me ask you to accompany me for a few moments to the camp of the Russo-Afghan Boundary Commission, of which we have telegraphic intelligence up to the 26th of August, just a week ago, and from which a letter in the 'Indian Pioneer' of the 18th of July brings full particulars under date Kham-i-Ab, June 15. . . . "Kham-i-Ab"—I have written it as printed in the 'Pioneer'—is a point near the Oxus, north of Andkúí. From Quetta to the Helmand the distance traversed may be estimated at nearly 320 miles, of which Nushki is not quite a third. I take my figures from Major Holdich's notes, in the 'Proceedings of the Geographical Society,' which include the stages and distances to Galicha; and from a letter in the 'Pioneer' of November 19, 1884, giving the distance from Galicha to Khwájah Ali on the Helmand at 53 miles—checked, moreover, by the above-named officer's statement that a place called Shah Ismaíl is halfway between Nushki and Khwájah Ali.

The country traversed was for the most part dreary and waste. Within 40 miles from Quetta the soil seemed "poor," and "the cultivation scanty," while it was not easy to obtain "such necessary supplies as wood and chopped straw." In 45 miles further it was "difficult to describe the general appearance of poverty and desolation"; while for the next 31 miles water was only procurable at one place—"a narrow little oasis." Then came a trying night march "of 25 miles over ground always rough and stony, and occasionally steep for laden camels." As for the

climate, the sun was intensely hot in the daytime, the cold bitter at night, and a "fine white dry dust" was blown about in constant clouds. The last 10 or 12 miles into Nushki was mainly along the bed of a stream. From Nushki to the Helmand there were three routes available, of which the Mission chose the most northerly, on account of its greater facilities for securing a sufficient supply of water. For nearly 80 miles of this distance—or to Gazchah—the characteristic of the ground was a flat, hard surface, commonly known in India and neighbouring countries as *put*, easy to cross, but monotonous to contemplate, and the writer's description of "the same wide expanse of limitless plain, the same stunted undergrowth, and occasional sun-ridges (or drifts) of a few yards only in width, but deep and shifting, with an occasional hut or *ziyárat* (the dwelling of a desert *fakir*), like an inverted bird's-nest of sticks adorned with quaint devices, leaves little wanting to complete an intelligible picture. From Gazchah onwards we are told that "a marked geographical change occurs," and that the line of march for about 90 miles further is "a mere track, winding and twisting over the successive waves of rolling stone-covered plateau hills, with the line of distant rugged peaks to the south; a few scattered isolated hills on the northern horizon, and one or two remarkable conical peaks rising straight up from the plain, forming a peculiarly definite line of landmarks for the marching force. The direction at night was indicated by fires kept up at intervals of a few miles." The last 50 miles or so to the river is "a troublesome strip of waterless desert." It should be noted that, with one exception, where it was reached at 25 or 30 feet below surface-level, Major Holdich states that five to six feet is about the average depth at which water is found between Nushki and the Helmand. . . .

"Khwájah Ali," writes Major Holdich, "where the Boundary Commission first struck the Helmand, exists only in name." Neither he nor the correspondents of the 'Pioneer' mention its distance from Rudbar, but it may fairly be concluded that it is not many miles to the eastward of that place. The river appears to have been forded at Chahár Burjak, whence the party moved up the right bank to Kala'i-Fath and Kohuk, passing on through Northern Sistan and its reed-beds to the Afghan territory of Lásh Juwain. Having myself visited the locality at which we have here arrived, it might naturally be inferred that I should pause to say something regarding it, but I will not weary you by recurring to narratives and descriptions published many years ago, reserving all personal experiences to guide me in the general conclusions to be submitted. How the British Commissioners for delineation of the Russo-Afghan frontier proceeded from Lásh Juwain to the immediate vicinity of Herat, and on to the quasi-Mesopotamia of Badkhiz, I leave to be dealt with by the gentleman who has kindly consented to read a paper on the subject of the Russo-Afghan frontier, geographically considered.

Time, too, warns me that I have detained you long enough, and that if my illustrations apply to the argument entrusted to your consideration, the application should at once be made evident. To my own mind the bearing is clear. A Boundary Commission represents the three branches of Science, Research, and Diplomacy—in other words, all that comes under Scientific Geography and Political Geography. The first, you will understand, comprises the survey of country, mapping, and determination of localities. The second has to do with the definition of territorial limits, and, in such sense, with history, ethnology, and laws of nations. That all this has been done, and well done, on the present occasion is not disputed, any more than that enlightened attention will be given to the due disposal of results. But are not these matters of sufficient importance to be taught as daily lessons in our schools, and presided over in university chairs? Even those barren and desolate lands of which we have now spoken—and I have myself traversed many miles of

such, some, indeed, in the near vicinity of the Perso-Afghan frontier, between Herat and Farah—they may have a meaning which can only be understood by the initiated; by those who have made them a long and seriously undertaken study. To the many they are but miserable deserts, displayed in incomplete maps; to the few, they may have a value far beyond their outer show. Were I asked to sketch out the kind of manual which might be useful in preparing officers for dealing with questions such as these, I would solicit reference to a late paper which I contributed to a quarterly journal, and which I have once before quoted. In it, I stated:—

"Asia itself is a stupendous study, but the difficulties may be smoothed to the learner by the judicious employment of method which, after disposing of essential generalities, would naturally tend to division and subdivision. The first would imply a region such as Turkestan; the second, a group of States or single States only, such as Bukhára and Khiva. Given, then, a particular area, the next consideration should be to explain its physical geography. This should comprise the scientific description of its mountains, rivers, and valleys. Its orography should be comprehensive in respect of direction, elevation, watersheds, and connection with plains and plateaux; its hydrography should treat of sources and mouths, basins, drainage, and connection with lake and swamp. Climate, and the more important forms of animal and vegetable life should succeed in due course; indeed, something of geology, zoology, and botany, and it may be more besides, might reasonably be added to satisfy the requirements of purely scientific teaching. After science, history would follow, and joined to history an account of the religion, manners, and customs of the people, as affected by the historical narrative; a statement of the artificial lines of separation, which have replaced natural boundaries in consequence of the wars, revolutions, and arbitrary changes which have characterised certain reigns or epochs; an exposition of the form or forms of government in vogue at different periods; and, finally, a chapter on trade and commerce, including a notice of indigenous products and manufactures. Maps, applicable to relations of territorial changes, would be of immense value; and an historian's criticism on these relations, if offered in that fair spirit which alone is justified in composing history, would be an indispensable complement."

But it is not the preparation of a manual which I have come before you to advocate. This would be one of the many fruits of a system now sorely needed for establishing at home the true position of geography as apprehended to a great extent abroad. I am one of those old-fashioned and perhaps obsolete persons who believe, not in the infallibility, but in the ability of this country as a governing Power. If that ability is proved in the creation and growth of its colonies, it is no less distinguished by an unselfish tendency to lead those colonies to govern themselves. But the unselfishness would be selfish if confined to the action of Great Britain alone. It should be an example to other States and Powers to "go and do likewise." That example, rendered available in international arrangements by fitting action at fitting opportunities, can only be carried out by a knowledge of geography in its widest sense. As to questions of territorial boundary, in Asia or elsewhere, we may be fortunate in having able officers to decide, and wise Governments to scrutinise decisions: but one generation may not keep pace with another generation in the character of its Governments or agents, and the doctrine of chances is not a safe one in a matter of State urgency.

Plainly, let us not lose the immense advantage given to us by Providence owing to the want of systematic knowledge in a branch of science in which we are shown to have been outstripped by Continental nations, but which all historical precedent warns us that it is our duty to foster to the uttermost.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—July 16th, 1886: M. A. Germain in the Chair. Dr. J. van Raemdonck presented a memoir on Gérard Mercator's map of the world published in 1538. A photolithographical copy of this map had been presented to the Society by the American Geographical Society of New York, in whose possession the only original copy was to be found.—Referring to Dr. Hamy's paper on the Copan ruins, read at the last meeting, M. Édouard Gibert communicated some observations in support of the theory which attributes to the Chinese and Japanese the discovery of America long before the visit of Christopher Columbus. M. Gibert concludes that the Fuegians are of the same race as the Esquimaux.—In connection with the recently published biography of Tavernier, the celebrated French traveller of the seventeenth century, M. G. Depping suggested that a suitable monument should be erected on the site of the traveller's grave near Moscow. The Chairman said that the matter should receive the attention of the Central Commission.—M. E. Hangsen Blangsted communicated the results of the census of Copenhagen taken in May last. The population was 285,700 as against 280,100 in February 1885. Copenhagen was, he said, relatively the most populous capital in the world, its population being one-seventh of that of the whole of Denmark.—The Assistant-Secretary read two telegrams, one announcing the arrival at Zanzibar of the Swedish Lieutenant, Gleerup, after having crossed the African Continent from west to east (he left Fallo on 1st December last); the other stating that Lieutenant Cardozo, the companion of Major Serpa Pinto, had arrived at Lisbon, having accomplished an important journey from the Mozambique coast to Lake Nyassa.—M. Virlet d'Aoust called the attention of the Society to the vote of credit made by the Chambers for the organisation of the French possessions on the Congo and Gaboon. Admiral Aube, he said, had proposed a fresh credit of 50,000 francs to assist the introduction of working men into French colonies, more especially to the Congo. M. d'Aoust compared this small sum to the lottery of 20,000,000 francs issued by the Belgian Government for the Free State of the Congo, and the reported international loan of 200,000,000 for the same object. He suggested the appointment of a commission to organise assistance for French emigrants.—Dr. Hamy made a communication with reference to the collections of the West African Mission on view at the Jardin des Plantes.—In conclusion, the Chairman declared the session closed, and stated that the next meeting of the Society after the recess would be held on the 5th November.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

[**The North Sea.**]—Die Ergebnisse der Untersuchungsfahrten S. M. Knbt. "Drache" (Kommandant Korvetten-Kapitän Holzhauer) in der Nordsee in den Sommern 1881, 1882 und 1884. Veröffentlicht von dem Hydrographischen Amt der Admiralität. Berlin, Mittler & Sohn, 1886: 4to., pp. 77. [Presented by the German Hydrographical Office.]

This is an important contribution to the hydrography of the North Sea; it contains observations on temperature and salinity, currents, the chemistry of the

sea-water, and on the specimens brought up from the bottom. Detailed observations are collected in a series of tables, and there are 15 maps and diagrams in which the results are graphically delineated.

ASIA.

Blanford, Henry F.—Report on the Meteorology of India in 1884. Tenth year. Calcutta, printed by the Superintendent of Government Printing, India, 1886: folio, pp. iv., 153, and 305, map and charts. [Presented by the Meteorological Office.]

[India.]—Indian Meteorological Memoirs: being occasional Discussions and Compilations of Meteorological Data relating to India and the neighbouring countries. Published by order of His Excellency the Viceroy and Governor-General of India in Council, under the direction of Henry F. Blanford, F.R.S. Vol. III. Part I. (pp. 116), and Vol. IV. Part I. (pp. 57). Calcutta, printed by the Superintendent of Government Printing, India, 1886: folio, map, charts, and diagrams. [Presented by the Meteorological Office.]

Vol. III, Part I. I.—The Rainfall of India, Part I.

Vol. IV, Part I. I.—Account of the South-west Monsoon Storm of the 12th to the 17th of May in the Bay of Bengal and at Akyab. II.—On the Diurnal Variation of the Rainfall at Calcutta. III.—The Meteorological Features of the Southern part of the Bay of Bengal.

Indo-China.—Bulletin de la Société Académique Indo-Chinoise de France, publiée sous la direction de M. de Mis. de Croizies, Président. Deuxième Série, Tome deuxième. Années 1882–83. Paris, Challamel Aêné, 1883–84–85: 8vo., pp. 730.

The principal original articles of geographical interest in this volume are the following:—History of the origin and development of Castes in India, by Charles Shöbel; Mahé and Goa, after an unpublished manuscript in the library of Abbé Pierfite, Curé of Anivelle (Vosges), entitled "Notes of a Voyage on board the Cordillère," by E. Ginin; Journal of Du Quesne-Guitton's two journeys to Siam (1681–91), from an unpublished manuscript in the Library of Marine, Rochefort, by Louis Delavand; Projects for Canalising the Isthmus of Krau, by Léon Dru; Documents relating to the Portuguese Missions to Cambodia and Cochin-China, by the Vicomte de San-Januario. Among the miscellanies is a great variety of information on the various countries and islands of Eastern Asia, besides the procès-verbaux of the meetings of the society.

Lefebvre, Paul.—Souvenirs de l'Indo-Chine. Faces Jaunes. Mœurs et coutumes de l'Extrême-Orient. Paris, Challamel Ainé, 1886: 12mo., pp. 224.

Legge, James.—A Record of Buddhistic Kingdoms, being an account by the Chinese Monk Fâ-Hien of his travels in India and Ceylon (A.D. 319–414) in search of the Buddhistic Book of Discipline. Translated and annotated with a Corean recension of the Chinese text, by James Legge, M.A., LL.D., Professor of the Chinese language and literature. Oxford, Clarendon Press, 1886: small 4to., pp. xv. and 123 (with Corean text appended). [Presented by the Delegates.]

Milne, John.—The Volcanoes of Japan. Vol. ix. part ii. of 'Transactions of the Seismological Society of Japan. Pp. 184.

Professor Milne has here collected much information, useful both to the geographer and the geologist, on most of the volcanoes of Japan, and they are many. A considerable number of these he has himself visited, and he gives the results of his observations, supplemented by much additional information, derived from a great variety of sources. The memoir is accompanied by severa plates of illustrations.

AFRICA.

Martinière, H. de la.—Essai de Bibliographie Marocaine (1844–1886). 'Revue de Géographie,' Août 1886, pp. 96–107; Sept. 1886, pp. 182–194. Paris, Delagrave.

Paulitschke, Dr. Ph.—Beiträge zur Ethnographie und Anthropologie der Somâl, Galla und Harari von Dr. Ph. Paulitschke. Leipzig, Frohberg, 1886: fol., pp. 4 and 106.

The purely geographical results of Dr. D. Kammel von Hardegger's and Dr. Paulitschke's expedition appeared in 'Petermann's Mitteilungen' some time ago. Dr. Paulitschke now publishes a handsome folio volume, illustrated with a map and forty photographs, containing the ethnographical and anthropological results. This work shows very clearly that competent explorers and travellers may still do useful service in parts of Africa readily accessible from the coast, and within a few weeks' journey from Europe. It is necessary, however, that they should qualify themselves for their task, and this not merely by acquiring the proficiency requisite for constructing a map of their route or of making anthropological measurements, but also by studying all that has been done by their predecessors in the same field, in order that their own energies may be devoted to increasing the existing stock of knowledge. Dr. Paulitschke has conscientiously undergone these preparatory labours, and the results achieved by him ought to encourage others to follow in his footsteps.

The work under notice presents us with a very full account of the Eisa, Gadabursi, Habr Aual and Ogaden Somal, of the North-eastern Galla, and of the people of Harar. The Somal Dr. Paulitschke looks upon as a bastard race, sprung out of a mixture of Hamitic Galla and Semitic Arabs. The Paria tribes among the Somal he considers to be Galla in origin. Of an alleged infusion of Greek or Egyptian blood he failed to discover a trace. Highly interesting is the information with respect to the Ethiopic Harari, who are stated to have formerly occupied a much wider area, as is proved by the ruins of ancient cities, destroyed in the wars between Granye the "left-handed" and the Abyssinians, and during the subsequent invasion of the country by the Galla. Harari is rapidly being superseded by Arabic, which is almost the only language now heard in the streets or in society. A kindred dialect is spoken in the villages on the south-eastern slope of Jebel Hakim, which overlook the fertile Erer valley, and have houses built of stone. The only book in Harari which Dr. Paulitschke was able to obtain was a collection of popular songs, and he was assured that no other books existed; he succeeded, however, in compiling a vocabulary containing several hundred words more than are given in Sir R. Burton's 'First Footsteps in East Africa.' In an appendix are given elaborate measurements of six natives, and of three Somal crania.

St. André, H. Pouget de.—La Colonisation de Madagascar sous Louis XV d'après la correspondance inédite du Comte de Maudave. Paris, Challamel Aîné, 1886: 12mo., pp. 220.

AMERICA.

[British Guiana.]—Timehri; being the Journal of the Royal Agricultural and Commercial Society of British Guiana. Edited by E. F. Im Thurn, M.A. Vol. iv. parts i. and ii., December 1, June 1885. Vol. v. part i., June 1886. London, Stanford.

Of geographical papers in these parts are the following:—The First Ascent of Roraima, by the Editor (vol. iv. part i.); The Colony of Surinam, by Dr. B. E. Colaço (vol. iv. part ii., vol. v. part i.); Red-men and their Thoughts, by the Editor; Colonial Jottings, by W. C. H. F. McClintock.

Hugues, Luigi.—Sul Nome "America." Torino, Loescher, 1886: 8vo., pp. 48. Price 1·50 lire.

In this brochure the author adduces evidence to prove that the general belief that America obtained its name from Amerigo Vespucci is quite justified.

ARCTIC.

[Jan Mayen.]—Die Oesterreichische Polarstation Jan Mayen ausgerüstet durch seine Excellenz Graf Hanns Wilczek, geleitet vom k. k. Corvetten-Capitän Emil Edlen von Wohlgemuth. Beobachtungs-Ergebnisse herausgegeben von der k. Akademie der Wissenschaften. III. Band. Mit 9 Tafeln und 2 Holzschnitten. Wien, Gerold's Sohn, 1886: 4to., pp. x., 132, 24, and 20. [Presented by the Imperial Academy of Sciences.]

This is the third volume of the publication noticed in the August number of the 'Proceedings,' p. 537. The present volume deals with the Zoology, Botany, and Mineralogy of Jan Mayen.

Nordenskiöld, Adolf Erik [Freiherr von].—Grönland. Seine Eiswüste im Innern und seine Ostküste. Schilderung der zweiten Dickson'schen Expedition ausgefuhrt im Jahre 1883 von A. E. Freiherrn von Nordenskiöld. Autorisirte deutsche Ausgabe. 200 Abbildungen und 6 Karten. Leipzig, Brockhaus, 1886: 8vo., pp. xiii. and 505. Price 24*s*.

It will be remembered that the object of the expedition, the results of which are described in this volume, was to penetrate as far as possible into the interior of Greenland, partly for the purpose of testing the theory of Baron Nordenskiöld that there must exist therein a region free from snow and covered with greenery. Baron Nordenskiöld and his party spent the summer of 1883 in carrying out his project, visiting on the return voyage the south-east coast of Greenland, to investigate the site of the old Norse colonies, and carry out surveys of the waters off the coast. The starting-point for the interior was Sofia Harbour, to the south of Christianshaab, and the region selected for the expedition lies between 68° and 69° N. lat. The course was almost due east, and Greenland was penetrated nearly to its centre, the latter part of the journey being performed solely by the Lapps attached to the expedition. So far as is known, no human being had before penetrated such a distance into the interior, and the knowledge gained through the expedition of the state of the inland ice is of much importance to science. The expected oasis was not found in this direction, though Baron Nordenskiöld is by no means convinced that it may not exist further north. The observations of the party along the east coast enable us to give more precision to the cartography of the region, as well as to add important data to our knowledge of its physical geography. The hydrographical researches were also of much value, especially with reference to the currents and temperature of the ocean in this region. In the first chapter of the volume Baron Nordenskiöld describes the plan and objects of the expedition. Two chapters are devoted to the journey outwards and observations suggested by the coast places visited. The fourth chapter deals with the inland ice and glacial periods, and the fifth with the journeys into the interior. The remaining chapters are devoted to Baron Nordenskiöld's special researches, and to the work of the expedition at various parts of the coast and the neighbouring waters. The last chapter deals entirely with the Eskimo. While a section of the party was in the interior, the *Sofia* made a cruise as far north as Cape York.

AUSTRALASIA.

Everill [Capt.] H. C.—Official Report of Capt. H. C. Everill, Leader of the New Guinea Exploring Expedition. Sydney, T. Richards, Government Printer, 1886: 8vo., pp. 20. [Presented by Capt. H. C. Everill.]

GENERAL.

Colonial and Indian Exhibition, London, 1886, Handbooks, &c.

Handbook to Cyprus (with map of Island) and Catalogue of the Exhibits. London, W. Clowes & Sons, 1886: 8vo., pp. 39.

Jamaica at the Colonial and Indian Exhibition, London, 1886. 8vo., pp. xii. and 100, map and plates. [Presented by C. Washington Eves, Esq., Honorary Commissioner.]

Encyclopædia Americana, The.—A Supplemental Dictionary of Arts, Sciences, and General Literature. Illustrated. Vol. III. Faed—Navy. New York, Philadelphia, London, J. M. Stoddart, 1886: 4to., pp. 824.

Fiorini, Matteo.—Misure linerari, superficiali ed angolari offerte dalle Carte geografiche. Firenze, G. Carnesecchi e Figli, 1886: 8vo., pp. 38. [Presented by the Author.]

Krümmel [Dr.] Otto.—Der Ozean. Eine Einführung in der allgemeine Meereskunde. Leipzig, Freitag, 1886: 8vo., pp. viii. and 242, 77 illustrations. [Presented by the Author.]

Oceanography has become a clearly recognised branch of physical geography. Several treatises have been published on the subject in Germany. The present small volume may be regarded as a popular introduction to the subject, and gathers up into brief space the leading facts of our knowledge of the ocean, under the heads of surface divisions, ocean depths, sea-water, and movements of the ocean.

Notice sur la Société de Géographie, fondée en 1821 reconnue d'utilité publique en 1827. Paris, Société de Géographie, 1886: 8vo., pp. 66, plans and diagram.

The following works have also been added to the Library:—

Bailey [Capt.] George W.—Report upon Alaska and its People, giving Statistics as to the Numbers, Location, Pursuits, and Social Condition of the Inhabitants; the Climate, Productions, and General Resources of the country; and of the Commerce, Ocean Currents, &c. Washington, Government Printing Office, 1880: 8vo., pp. 52, map and plate. [Presented by Daniel Manning, Secretary of the United States Treasury.]

Bronner, F. J.—Parallelismus der Flusssysteme Europas, Asiens, Afrikas und Amerikas. Vergleichungen der wichtigsten Ströme dieser Erdteile. Beitrag zur Methodik des geographischen Unterrichtes. München, Max Kellerer, 1885: 8vo., pp. 64.

Ellis, William.—Brief Historical Account of the Barometer. [From the Quarterly Journal of the Royal Meteorological Society, vol. xii., No. 59. July, 1886.] 8vo.

Playfair, [Lieut.-Col.] R. L.—The Scourge of Christendom: Annals of British Relations with Algiers prior to the French Conquest. London, Smith, Elder, & Co., 1884: 8vo., pp. xiv. and 327, plans and plates. [Presented by the Author.]

Riley, A.—Narrative of a Visit to the Assyrian Christians in Kurdistan. Undertaken at the request of the Archbishop of Canterbury, in the Autumn of 1884. 8vo., pp. 20. [Presented by the Author.]

Simon, Gabriel.—Voyage en Abyssinie et chez les Gallas-Raias. L'Éthiopie, ses mœurs, ses traditions, le Négouss Iohannès, les églises monolithes de Lalibéla. Paris, Challamel Ainé, 1885: 8vo., pp. vii. and 374, map and plates.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

EUROPE.

France.—Carte du région du Nord de la ——, Département du Nord, du Pas de Calais et de la Somme, Flandre, Picardie, Artois. Scale 1 : 390,000 or 5·2 geographical miles to an inch. Paris, J. Gautier. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued during the month of August 1886.

1-inch—General Maps :—

ENGLAND AND WALES: Sheet 255 (New Series), 1*s.* SCOTLAND: Sheet 28 (Hill-shaded), 1*s.* 9*d.*

6-inch—County Maps :—

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following Area Book, although not published, can be had to order without Index Map:—Hopton Castle, 1*s*. **Somersetshire:** VIII. 5, XVIII. 5, 3*s*. each; XX. 15, 5*s*.; XXX. 4, 8, XLII. 11, 3*s*. each; LII. 16, 4*s*.; LV. 7, 12, 14, LV. 16 and LXVI. 4 on one sheet, 3*s*. Area Books: Blagdon, Burrington, Butcombe, Tickenham, 1*s*. each. The following Area Books, although not published, can be had to order without Index Maps:—Backwell, Barrow-Gurney, Brockley, Compton Dando, Portbury, Portishead, 1*s*. each. **Suffolk:** XXIV. 1, 4, 4*s*. each; XXIV. 5, 3*s*.; XXIV. 6, 4*s*.; XLII. 6, 6*s*. 6*d*.; LII. 11, 15, 16, LXI. 2, 3, 4, 6, 15, 3*s*. each. Area Books: Fornham Saint Martin, Great Barton, Hardwick, Rougham, 1*s*. each. The following Area Books, although not published, can be had to order without Index Maps:—Alpheton, Aspall, Baylham, Bedingfield, Brettingham, Brundish, Cockfield, Dalham, Dennington, Fornham All Saints, Framlingham, Fressingfield, Great Ashfield, Great Bricett, Great Finborough, Hawkedon, Hepworth, Herringfleet, Hitcham, Kettlebarton, Langham, Lavenham, Lawshall, Saxfield, Little Finborough, Mendham, Otley, Ousden, Pakefield, Preston, Rattlesden, Rede, Ringshall, Southholt, St. Peter (South Elham), Southwell Park, Tannington, Washbrook, Wattisham, Wenham Parva, Willisham, Winston, Woolpit, Worlington, Worlingworth, 1*s*. each. **Warwickshire:** XXIX. 1, 3*s*. **Wiltshire:** X. 15, 4*s*.; XII. 4, 3*s*.; XIII. 9, 12, 4*s*. each; XIX. 1, 2, 13, XX. 9, 16, XXV. 2, 3, 4, 7, 16, XXVI. 3, 3*s*. each; XXVI. 4, 4*s*.; XXVI. 5, 6, 8, 3*s*. each; XXVI. 10, 4*s*.; XXVI. 11, 12, 15, 16, XXVII. 4, 6, 15, XXX. 3, XXXIII. 2, 3, 7, 10, 3*s*. each; XXXIII. 12, 13, 4*s*. each; XXXIII. 16, XXXIV. 5, 3*s*. each. **Worcestershire:** XLII. 11, 12, 3*s*. each. Area Books: Grafton Manor, Redditch, Tutnall and Cobley, Upton Warren, Webheath, 1*s*. each. The following Area Books, although not published, can be had to order without Index Maps:—Badsey, Bretforton, Church Honeybourne, Clifton-upon-Teme, Dodderhill, Great Witley, 1*s*. each; Kidderminster Foreign, 2*s*.; Little Witley, Lower Sapey, 1*s*. each; Martley, Old Swinford, 1*s*. 6*d*. each; Pedmore, Saint Peter, &c., Shelsley Beauchamp, Shelsley Walsh, Shrawley, Wichenford, 1*s*. each. **Yorkshire:** CLXXXII. 2, 3, 6, 3*s*. each.

Town Plans—10-feet scale:—

England and Wales: Bath, XIV. **1**, 9, 13, 15, 16, 21, 23; XIV. **2**, 1, 6, 11, 12, 17, 21; XIV. **5** 3, 8, 11, 13, 14, 17, 19, 20, 23; XIV. **6**, 7, 17; 2*s*. each. Frome, XXX. **14**, 14, 15, 18, 20, 23; XXX **15**, 6; XLIII. **2**, 3, 13; XLIII. **3**, 2; 2*s*. each. Hereford, XXXIII. **11**, 24; XXXIII. **12**, 20, 22, 23; XXXIII. **15**, 20; XXXIII. **16**, 2, 13, 22, 23, 24, 25; XXXIV. **13**, 17; XXXIX. **3**, 5; 2*s*. each. Leominster, XII. **15**, 8, 9, 14, 16; 2*s*. each. Peterborough, VIII. **7**, 22; VIII. **12**, 7; 2*s*. each. Stamford, CLI. **5**, 12; 2*s*. Weston Super Mare, IX. **15**, 25; 2*s*. each. Wolverhampton, LXII. **7**, 12; 2*s*.

(*Stanford, Agent.*)

AFRICA.

Afrika.—Karte von —— mit besonderer Berücksichtigung der deutschen Kolonien von W. Liebenow, Chef des Kartogr. Bureau im Königl. Ministerium der öffentl. Arbeiten. 4 Blatt in Farbendruck. Scale 1:10,000,000 or 133 geographical miles to an inch. Berlin 1886. Berliner Lithogr. Institut (Julius Moser). Price 6*s*. (*Dulau.*)

Kassai, R.—Originalkarte der Itinerar-Aufnahmen und Erkundigungen des Prem. Lieut. Curt von François, Mitglied der 2r. Wissmann'schen Forschungs-Expedition 1884–1885 im Stromgebiet des Kassai 16 Juni 1884 bis 17 Juli 1885. Nach den Original-Aufnahmen im Massstab von 1:400,000, reduziert auf den Massstab von 1:200,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Taf. 13. Justus Perthes, Gotha. (*Dulau.*)

AMERICA.

Honduras.—Mapa de la República de ———. Por A. T. Byrne, C.E., M.E., Ingeniero Civil del Gobierno de Honduras. 1886. Publicado por G. W. & C. B. Colton y Compª, Nueva York. Scale 1:1,000,000 or 13·6 geographical miles to an inch. (*G. Philip & Son.*)

The author does not mention the sources from which he has derived the information used in the construction of this map. This is to be regretted, as such a statement would have enabled those interested in this part of the world to judge as to how far the topographical details given would be likely to be accurate. The principal feature in this map is the manner in which it indicates the presence of minerals in different districts, and as Mr. Byrne holds the position of Consulting Engineer to the Civil Government of Honduras, he is in a position to give the public reliable information on this subject. All towns are distinguished with reference to their importance by symbols; and navigable rivers, telegraph stations, railways, and other means of communication are also shown. A request is made by the publishers that all persons who have reliable data in their possession with regard to Honduras, will communicate with them, in order

that such material may be used for the correction and improvement of future editions of this map; and as there is great room for improvement in all the maps of this region which have been previously published, it is to be hoped that the publishers' request may meet with a fitting response.

AUSTRALASIA.

Kimberley District, W.A.—Map of the Surveyed portion of ——. Compiled from the latest information by Gilb. R. Young, Surveyor. Published by A. C. Macdonald, F.R.G.S. Melbourne, 1886. Scale 1:949,000 or 13 geographical miles to an inch.

This is a very important map, and contains much information with regard to the Kimberley District of Western Australia that is entirely new, and which must have been derived from the surveys of our Gold Medallist, Mr. John Forest, that gentleman having been sent by the Government, in March of the present year, to report on the large area of auriferous country discovered by Mr. Hardman in 1885. The result of Mr. John Forest's expedition has been an important addition to our knowledge of geography in the neighbourhood of Cambridge Gulf and along the valleys of the King and Ord rivers, as well as the whole country bordering on the route between Wyndham, the new settlement on Cambridge Gulf, and Derby on King's Sound, and the proclamation of a gold district extending from lat. 16° S. to 19° 30′ S., and from long 126° E. to long. 129° E., which is indicated by a broad pink border on the map.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in July and August 1886.

No.			Inches.	
1702	m	=	3·95	Newfoundland, south coast:—Lamalin harbour and road. Price 1*s.*
398	m	=	1·95	West Indies, Little Bahama bank:—Whale cay channel and Green Turtle cay anchorage. Price 1*s.*
922	m	=	2·98	North America, west coast, British Columbia:—Burrard inlet. Price 2*s.*
940	m	=	2·5	Sumatra, south coast:—Telok Belung. Price 1*s.*
937	m	=	2·0	New Guinea, east coast: Goschen strait and channel round East cape. Price 2*s.*
938	m	=	0·25	New Guinea, north-east coast:—East cape to cape Nelson, with the D'Entrecasteaux islands. Price 2*s.*
939	m	=	0·25	New Guinea, north-east coast:—Cape Nelson to Hercules bay. Price 2*s.*
1375	m	=	0·1	Pacific ocean:—Galápagos islands (plans, James, Sulivan, Conway, Freshwater, Post Office, Garden, Wreck bays; Iguana, Tagus coves. Terrapin road). Price 1*s.* 6*d.*

2701 Ionian sea, Gulf of Cattaro to Corfu:—Plan added, port Otranto.

285 Newfoundland, Orange bay to Gander bay:—Plan added, Round harbour.

292 Harbours and anchorages in the southern portion of Newfoundland:—Plans added, Bonne bay. Harbour Breton.

1358 South America, Union bay to Rio Negro:—New plan of San Blas harbour.

1508 Anchorages in New Hebrides islands:—New plans. Steep Cliff bay. Rodds anchorage. Dip Point anchorage. Port Resolution.

(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
1499	Port Otranto	New plan, Port Otranto on chart	2701
1702	Lamalin harbour	New plan, Lamalin harbour and road	1702
398	Whale and Green Turtle cay anchorages	New plan, Whale cay channel and Green Turtle cay anchorage	398
4	Plan of Diego Garcia on this chart	New plan, Diego Garcia from entrance to East point	920
1375	Galápagos islands, with plans ..	New plan, Galápagos islands, with plans	1375
292	Harbours and anchorages in the southern portion of Newfoundland :—Plans of Red island road and Frenchman harbour on this chart.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1179. England, west coast :—Bristol channel. 1975. Kentish Knock and the Naze to West Swin. 2567. England, east coast :—Tees bay. 45. Ireland, east coast :—Carlingford to Larne. 1447. Ireland, east coast :—Dublin bar and the river Liffey. 1406. England, east coast :—Dover and Calais to Orfordness and Scheveningen. 1875. Elbe, Weser, and Jade rivers. 2329. Norway, south coast :—Sandö to Svenöer. 790. Baltic sea, Kattegat :—Approaches to Copenhagen. 2694. France, west coast :—Channels between Ile D'Ouessant and the mainland. 1657. Mediterranean, Greece :—Part of the Gulf of Athens. 1159. Mediterranean, Tunis :—Soussa to Mehediah with the Kuriat islands. 2489. North America, east coast :—Monomoy or Old Stage harbour. 2818. United States :—Hampton roads and Elizabeth river. 1544. Central America, west coast :—Port Simpson to Cross sound. 650. Africa, west coast :—Ouro river. 2160. Eastern archipelago :—Carimata strait. 2575. Celebes sea, eastern part. 2062. China, south coast :—Tongking gulf. 1739. China, Canton river :—Whampoa channel and Chang-shan island to Canton. 1761. China, east coast :—Matheson port to Ragged point. 1199. China, east coast :—Kweshan islands to Yang-tse-Kiang. 1602. China, east coast :—Entrance to Yang-tse-Kiang. 1480. China, east coast :—Yang-tse-Kiang from the sea to Nanking. 1708. Australia, north coast :—Albert river. 1048. Australia, north coast :—Buccaneer archipelago to Bedout island. 1058. Australia, west coast :—Rottnest island to Warnbro sound. 2726 :—New Zealand :—Manukau harbour.
(*J. D. Potter, agent.*)

Dépôt des Cartes et Plans de la Marine.—No. 4120. Côte Nord de France, Entrée de la Rivière de St. Pol de Léon ou Penzé. 1886.—4067. Publication provisoire. Mer de Chine. Tonkin. Canaux Intérieurs entre Ko-Kaï-Moun et Cua-Tien. 1885.—4066. Publication provisoire. Mer de Chine. Tonkin. Canaux Intérieurs entre Ke-Bao et Tien-Yen. 1885.—4108. Côte Occidentale d'Afrique. Baies de Loango et de La Pointe Noire. 1885.—4113. Océan Indien, Madagascar, Baie de Vohemar, Entrée de Vohemar. 1885.—4061. Rio de la Plata. Baie de Montevideo. 1885.—4116. Côtes du Pérou. Ilcs Lobos de Afuera. 1886.—4051. Archipel du Cap Horn. Iles l'Hermite, Wollaston &a, et Presqu'ile Hardy. 1885.—4049. Ports et Mouillages de l'Archipel du Cap Horn. 1885.—4115. Amérique Méridionale, Côte Sud de la Terre de Feu. Archipel du Cap Horn et Canal du Beagle. Du Détroit de Lemaire à la Baie de Cook. 1885.—4118. Océan Pacifique, Archipel de la Société. Ile Moorea. 1886.—4073. Océan Pacifique, Archipel de la Société. Iles Raiatea et Tahaa. 2ème Feuille. Ile Raiatea, Partie Nord, 1885.—4074. Océan Pacifique. Archipel de la Société. Iles Raiatea et Tahaa. 3ème Feuille. Ile Raiatea, Partie Sud. 1885.—4109. Océan Pacifique. Iles Carolines. Iles Ruk ou Hogolu. 1885.—Dépôt des Cartes et Plans de la Marine, Paris.

North Atlantic Ocean.—Pilot Chart of the ———, September 1886. Published monthly at the Hydrographic Office, Navy Department, Washington, D.C. J. R. Bartlett, Commander U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

Berghaus' Physikalischer Atlas (begründet 1836 von Heinrich Berghaus). 75 Karten in sieben Abteilungen, enthaltend mehrere Hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, und Dr. Karl v. Zittel, herausgegeben von Professor Dr. Hermann Berghaus. Vierte Lieferung. Inhalt: Nr. 5, Eisverbreitung. Nr. 29, Juli-Isothermen. Nr. 53, Verbreitung der Säugetiere II. Gotha, Justus Perthes, 1886. Price 3*s.* each part. (*Dulau.*)

In this part, sheet No. 3 contains two principal maps, drawn on Lambert's Azimuthal projection, on which is indicated the positions of ancient and present ice-distribution, and five secondary maps of the glaciers of the Rhone, the Rhine, the Lorsach and Inn, the European Alps, and North America. The map of the European Alps is a beautiful specimen of minute map engraving, but is drawn on so small a scale as to be somewhat confusing to any but those with very good eyesight. Sheet No. 29 contains a map of the world on Mercator's projection, on which are indicated the isothermal lines of the mean temperature for the month of July, the quantities being given according to the Centigrade scale, with a table for converting them into Fahrenheit readings. There are also three inset maps, which show respectively the variations of temperature from the normal during the month of July, the isothermal lines for the North Polar regions for the same month, and the mean temperature for British India during the month of May. Sheet No. 53 contains six maps, indicating the distribution of mammals.

Saint Martin, M. Vivien de.—Atlas Universel de Géographie Moderne, Ancienne et du Moyen Age, construit d'après les sources originales et les documents les plus récents, cartes, voyages, mémoires, travaux géodésiques, etc.; avec un Texte Analytique par M. Vivien de Saint-Martin et Fr. Schrader. Environ 110 Cartes, gravées sur cuivre sous la direction de MM. E. Collin et Delaune. 6e Livraison, contenant: Suède, Norvège (feuille septentrionale), Danemark, Belgique, Amérique Centrale. Paris, Hachette et Cie. Price 5*s.* (*Dulau.*)

It is rather more than twelve months since the appearance of the last issue of this Atlas, and at its present rate of publication it will take not less than fifty-seven years to complete. There is, however, some hope that a little more activity may be displayed in the future as the explanation given as to the mode of publication contains an announcement that a number of the maps are now in the engraver's hands.

The present issue contains three maps, all of which are beautifully executed. That of Belgium is for the most part taken from the maps of the Belgian État-Major, and contains three inset maps, on a large scale, of the environs of Brussels, Charleroi, and Liége. The portion of this map containing the Grand Duchy of Luxembourg is a reduction of the 1 : 40,000 map by J. B. Liesch, with corrections by M. Hansen. The next map, which contains the northern portions of Sweden and Norway, has been compiled from the thirty sheet map of Finland, on the scale of 1 : 400,000, Munck's map of Norway, and all other reliable authorities. The map of Iceland which occupies a corner of the sheet has been taken from O. N. Olsen's large map, corrected by the maps of M. J. Leclercq and Mr. John Coles. The third map is one of Central America, and has been compiled from the best available material, such as the maps of Codazzi, Ponce de Leon, E. G. Squire, the surveys made in connection with the Panama Canal, &c. The ocean depths are indicated by contour lines, and an excellent map of the Isthmus of Panama is given, showing the canal at present in course of construction.

Scheda.—Steinhauser's Hand-Atlas der neuesten Geographie nebst einem Anhange von Karten zur mathematisch-physikalischen Geographie von A. Steinhauser k. k. Reg.-Rath. Wien, Artaria & Co. (*Dulau.*)

This is a new edition, and has been carefully revised and corrected. It is divided into two parts, the first containing twenty-three maps illustrating the political geography of the world, and one hypsometrical map of the Alps, and the second is devoted to physical and mathematical geography. Speaking generally, the political maps are beautifully executed, but the hill-shading in some of them, as for instance, those of Switzerland and the Tyrol, is too elaborate for maps of such small scale, and is therefore somewhat confusing. The orographic map of the Alpine chain is on an enlarged scale, the heights being indicated by colours and contour lines, and at the bottom a profile of the range is given coloured in the same manner as the map, and drawn on a graduated scale, so that the height of any mountain is seen at a glance. The physical portion of this atlas is particularly worthy of attention, and is well suited for the use of students who have made some progress in their geographical studies, or as maps of reference for those interested in meteorology, geology, and the projection of maps. The celestial maps, as well as those illustrating the planetary movements and the solar system, are worthy of all praise.

The following are the contents of this atlas:—I. *Abtheilung.* Länder-Kunde. I. Hemisphären. II. Europa (1 : 13½ Mill.). III. Asien (1 : 26⅔ Mill.). IV. Afrika (1 : 26⅔ Mill.). V. Nord-Amerika (1 : 26⅔ Mill.). VI. Süd-Amerika (1 : 26⅔ Mill.). VII. Australien (1 : 32 Mill.). VIII. Oesterr.-ungar. Reich (1 : 3 Mill.). IX. Deutschland (1 : 3 Mill.). X. Frankreich (1 : 3 Mill.). XI. Britische Inseln (1 : 3 Mill.). XII. Italien (1 : 3 Mill.). XIII. Schweiz (1 : ⅔ Mill.). XIV. Spanien und Portugal (1 : 3 Mill.). XV. Europäische Turkei (1 : 3 Mill.). XVI. Schweden und Norwegen (1 : 4½ Mill.). XVII. Nord-Russland (1 : 6 Mill.). XVIII. Süd-Russland (1 : 6 Mill.). XIX. Erzh. Oesterreich ob und unter der Enns, Salzburg, Steiermark, Kärnten, Krain und das Küstenland (Inner-Oesterreich) (1 : 1 Mill.). XX. Tirol und Vorarlberg (1 : 1 Mill.). XXI. Böhmen nebst Mähren und Schlesien (1 : 1 Mill.). XXII. Galizien und Bukowina (1 : 1 Mill.). XXIII. Königreich Ungarn (1 : 2 Mill.). XXIV. Hypsom. Karte der Alpen (1 : 1·7 Mill.).—*II. Abtheilung.* Karten zur mathematisch-physikalischen Geographie. (*a*) Zur mathematischen Geographie. 1. Himmels-Planigloben. 2. Aequatorialzone der Himmelskugel. 3. Planeten System. 4. Sonne und Mond. 5. Erdstellungen. 6. Projectionen.—(*b*) zur physikalischen Geographie. 7. Wärmeverbreitung auf der nördlichen Erdhälfte. 8. Oceanographie. 9. Magnetismus. 10. Geologische Uebersichtskarte der Erde. 11. Hypsometrische Uebersichtskarte der Erde. 12. Wind- und Regenkarte. 13. Luft- und Dunstdruck. 14. Schwerkraft.

Schweiz.—Topographischer Atlas der —— im Masstab der Original-Aufnahmen nach dem Bundesgesetze vom 18. Dezember 1868, durch das eidgenössische Stabsbüreau unter der Direktion von Oberst Siegfried veröffentlicht. XXIX. Lieferung: Nr. 180, Ursenbach; 235, Hochalp; 254, Wildhaus; 269, Weisstannen; 279, Noiraique; 344, Matran; 345, Marly; 370, Signau; 383, Röthenbach (on the scale of 1 : 25,000); 422, Lenz; 482, Sierre; 483, St. Maurice (on the scale of 1 : 50,000). Bern, Schmid, Francke & Cie. (vormals Buchhandlung Dalp, Bahnhofplatz). Price 12*s.* 6*d.* (*Dulau.*)

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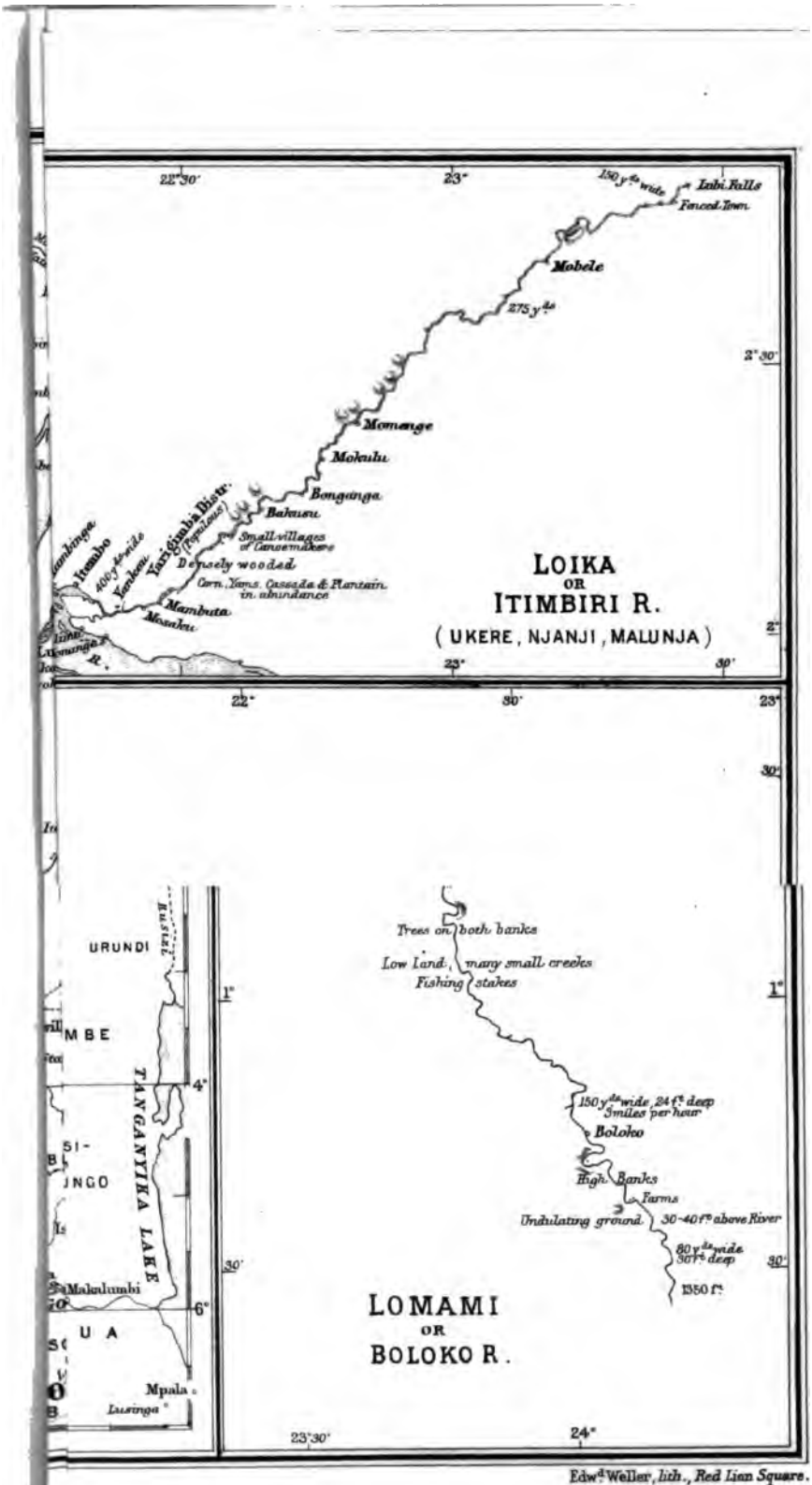
Deutschland.—Schul-Wandkarte von ——, von G. Woldermann. Scale 1 : 600,000, or 8·1 geographical miles to an inch. Physikalische Ausgabe. Dresden, Jaenicke. 9 sheets, 10*s.* (*Dulau.*)



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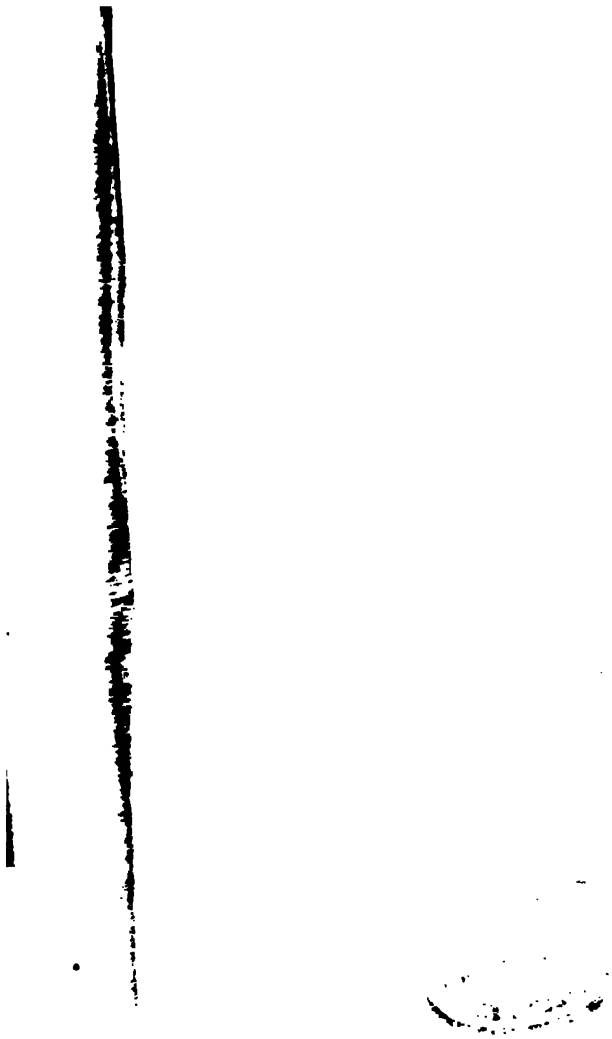

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THE WESTERN ALPS

to illustrate Mr Freshfield's Paper on

THE PASSAGE OF HANNIBAL.

Hannibal's route to the island & beyond the Taurini

ALPINE ROUTES.

Col de l'Argentière
Mont Genèvre
Petit Mont Cenis
Colonel Perrin's variations
Petit St Bernard

English Miles
25 30

Greek Stades
0 100 200 300

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Edwd Weller lith.

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The River Systems of South India.

By Lieut.-General F. H. Rundall, R.E., C.S.I.*

Map, p. 752.

In order to arrive at a clear understanding of the river systems of any country, a previous knowledge of its general configuration is essential. I will therefore first shortly describe the physical features of the Indian Peninsula, which is comprehended between the parallels of 8° and 24° S. lat. It will be seen from the map that two ranges of mountains skirt, for the most part, its west and east coasts. The mountains are of varying elevation. The western coast range attains a maximum altitude of 8400 feet in the Nilghiri, or Blue Mountains portion, near its southern extremity, diminishing to about 4000 feet as it extends northward, until it meets the Vindhya, a range which, traversing Central India, terminates in the Kymore Hills, that overhang the valley of the Ganges at the point where its great tributary, the Sone, enters the plains. South of the Nilghiris there is a low saddle in the range, at a place called Pálghaut, over which the Madras Railway is carried to its terminus on the western coast. South of that saddle again rises the high Travancore range, which stretches to Cape Comorin, the extreme point of the Peninsula. Connected with, and part of this range, are the Palney Hills, whose elevation is over 8000 feet, and in whose slopes spring the sources of the valuable rivers which irrigate the fertile plains of the Tinnevelly and Madura districts. At Pálghaut the western range turns abruptly and runs for some miles due east, and then trends away north-east to the latitude of Madras, from whence the Eastern Hills turn nearly due north, as far as the Kistna, where there is a gorge, through which that river runs before entering the delta which stretches to the coast. The hills thence continue in a northerly direction till the next remark-

* Read in the Geographical Section of the British Association, Birmingham, September 6th, 1886.

able gorge, that through which the Godavery flows, is reached, and curving round there, follows an easterly course to the sea-coast, south of Vizagapatam. From thence the range stretches north-east, gradually diminishing in elevation until it reaches the head of the Ganges delta at Rajmahal, and then trending north-west as far as the Sone, skirts that river to its source, and breaks up into a series of small hills, which are scarcely distinguishable from the great northern plains which they fringe. North of the Godavery the eastern range is once more pierced by the river Mahanuddy, between which and the Ganges there are several minor streams which carry off the rain falling on the range itself, into the Bay of Bengal.

Between the Western and Eastern Ghauts are comprehended several plateaux, of varying elevation, to which the general name of the Dekkan, or South Country, is given, and the principal of which is the Mysore plateau, standing between 2000 and 3000 feet above sea-level. The western range rises abruptly from, and skirts the coast along its entire length, consequently its slopes on that side are very steep. On the east face they incline more gently down to the central plateau, which is itself bounded by minor ranges of hills, between the foot of which and the sea there is some breadth of low-lying land.

This peculiar configuration determines to some extent the climate of the Peninsula, and materially affects the distribution of the rain falling in the respective seasons of the year. There is no such thing in any part of India as a more or less regular rainfall throughout the twelve months; and in the Peninsula particularly, the rainy season is especially marked, occurring as it does in the middle of May on the southern extremity of the Western Ghauts, and lasting with more or less intensity until September. The south-west monsoon, however, does not, as might be supposed, strike directly across the Peninsula, but attracted by the high range of the Western Ghauts, travels along it until it reaches Bombay and the lower range of the Vindhya Hills. Gradually diminishing in intensity, it passes across Central India and the valley of the Ganges in lessened force until the lofty Himalayan range is reached, on which that portion of the monsoon which has simultaneously swept up the Bay of Bengal has already discharged itself. The elevation of the Western Ghauts presents a barrier to the first outburst of the south-west monsoon and arrests its onward progress across the Peninsula. The great central plateau of the Dekkan, thus, not only receives a greatly diminished fall of rain, but is subjected also to great fluctuations in the actual quantity that does fall, for such of the rain-charged clouds as do roll over the western mountains, deposit the greater part of their contents on the eastern slopes, and so pass over the comparatively treeless plateau in small volume until they reach the forest-clad eastern range, and accumulating there, discharge their moisture again in larger quantity upon them. But the country lying between the foot of that

range and the coast south of latitude 15°, gets little or none of the south-west monsoon, but receives its supply, amounting to between 30 and 40 inches, all from the north-east in the space of the two months November and December. Consequently, it is dependent partly on the spasmodic falls which occur in the Mysore plateau, with the exception of that tract which is dependent on the river Cauvery, whose source is in the east slopes of the Western Ghauts. The western range receives on its west face from 100 to 130 inches of rain, which at Bombay itself is reduced to 74 inches, further gradually diminishing to about 42 inches at Surat in latitude 21°, and to 32 inches in Central India, but increasing to 48 and 50 inches as the valley of the Ganges is reached.

On the Dekkan plateau the rainfall varies from 16 to 27 inches in the north and to somewhat more at the extreme south border which lies at a greater elevation. On the eastern range, north of latitude 15°, the effects of the south-west monsoon are again felt. On the hills themselves the amount reaches 50 inches, but on the plain bordering the sea, it is less than 40 inches, until the Orissa coast is reached, where, as well as in the highlands, the quantity averages from 55 to 60 inches, increasing to 75 inches in the neighbourhood of the mouths of the Ganges. The direction of the prevailing winds is similarly very diverse. On the west coast, as might be expected, they blow chiefly from the west and south-west; while on the east, it is between east and south-east that the winds prevail. In the north-west portion of the Peninsula they blow principally from north-west to north-east, while on the opposite coast they vary in about equal proportion between north-east and south-west; but on the central plateau, a northerly direction is maintained for the greater portion of the year. Hence the climatic conditions of South India, both as regards temperature and humidity, vary considerably. The rate of evaporation being correspondingly affected, as well as the proportion of rainfall running off and through the soil, the floods carried by the rivers draining the respective basins, independently of their geological formation, are variously affected both as to volume and duration.

We have thus prepared the way for the consideration of the Rivers themselves, which may be briefly described as of two types: the one furnished with only partial and spasmodic supplies, the other enjoying a more or less abundant perennial flow. As they all discharge themselves either on the west or east coast, it will be most convenient to consider the Peninsula as divided into two systems of east and west drainage, of which the latter comprises 106,600 square miles, and the former 376,000 square miles. In the west division there are but two rivers of magnitude, viz. the Nerbudda and Taptee, whose catchment basins measure respectively 37,500 and 25,250 square miles. The rest of the country, consisting of the narrow strip lying between the mountains and the sea, is drained by a number of small streams which

belong rather to the category of mountain torrents. On one of these is situated the renowned and picturesque Garsippa Falls, celebrated not so much for their volume as for their height, there being a clear perpendicular drop of 900 feet. The Nerbudda and Taptee are similar in character, both having long narrow basins separated from each other by the Satpoora range. That of the Nerbudda is contained between it and the Vindhya range, while the adjoining basin of the Taptee lies between it and the Ajunta Hills, and flows past the foot of the Khandeish plateau, having its source in the plain of Berar, the ridge of which separates the western from the eastern drainage. The Nerbudda takes its rise at Ammerkantak, a place of much sanctity in the eyes of Hindoos, as being the source of a feeder of each of the three other great rivers, the Godavery, the Mahanuddy, and the Sone. Though Ammerkantak is only 600 miles in a direct line from the coast, the course of the Nerbudda measures nearly 800 miles. Its upper reaches pass for about 300 miles through basaltic formation, and are broken up into a series of rocky barriers, rapids, and falls, as far as Jabbalpoor. At that place occur the beautiful marble and agate rocks, specimens of which cut into paper-knives, dessert-knife handles, and other things may be seen in the Indian Court of the great Colonial Exhibition. From Jabbalpoor, which is 1200 feet above sea-level, for about 200 miles the river is navigable, but from there it is broken up more or less into rocky rapids until about 70 miles from the sea, which after a tortuous course it reaches at the town of Baroach. Owing to these intermediate obstacles, which would be difficult and very expensive to overcome, the use of the river as a line of navigation has hitherto been impracticable, while the soil throughout almost its entire length consisting of that known in India as "black cotton," is rarely irrigated, the cultivators having an idea that irrigation is injurious to the crops ordinarily grown thereon. The floods in the Nerbudda are very heavy, rising between 70 and 90 feet, and have inflicted more than once considerable injury to the great bridge which spans it on the Bombay and Baroda railway. The Taptee takes its rise in the spurs of the Satpoora range, and derives its supply from the drainage of that and the Ajunta Hills. Its length is 440 miles, and the average width of its basin 60 miles, the fall of the bed being about three feet per mile. The rainfall varies from 35 to 40 inches, and occurring only in the south-west monsoon, the supply of water falls very short in the dry season. The soil of its basin, principally trap, is similar to that of the Nerbudda, but having a larger proportion of alluvium, endeavours have been made to utilise the monsoon supply by constructing reservoirs and canals on some of its feeders. At the mouth of the Taptee stands Surat, once a city of considerable commercial importance, but now overshadowed by Bombay. The floods of the Taptee during the rainy season, like those of the Nerbudda, are oftentimes very severe, while the volume during the other months is very trifling.

Turning now to the rivers which carry off the eastern drainage and empty themselves into the Bay of Bengal, the most northerly is the Subanrika or River of Golden Sand. Its source lies in the range of the Eastern Ghauts, which run due north from the Mahanuddy, and which are there covered with dense forests of sāl trees. It has a moderate slope of bed throughout its entire length of about 300 miles. In the last 100 miles of its course, its bed is composed of very fine sand, and it terminates in a small delta close to the sea. Its catchment basin, which comprises alluvial, carboniferous, and metamorphic rocks, measures about 10,000 square miles, over which there is a rainfall of from 60 to 70 inches. In extreme floods it overflows the banks in the lower parts of its course, and carries an immense amount of detritus in suspension. No use is as yet made of this river for navigation or irrigation purposes beyond the floatation of timber from the forests, the sāl in which is of very fine quality. The Subanrika flows through the large estate of Mohurbunj, the abode, as the name implies, of pea-fowl, which are held sacred by the people, and accordingly are not allowed to be shot, but the same prohibition does not extend to the varieties of large game which abounds in those forests. Next in order are two rivers, the Byturnee and Braminee, whose sources are situated in the same mountains and are supplied by the same rainfall. These two rivers form part of the Orissa system, and are essentially deltaic, with a common estuary, which but for the bar at its mouth would admit of vessels of great draught ascending the river for at least 30 miles from the sea. All particulars regarding them will be noticed when the Mahanuddy or Great River comes under consideration. From the Subanrika to below the city of Madras the drainage is carried off by three great delta rivers, the Mahanuddy, Godavery, and Kistna, and a smaller one, the Pennar. Before describing them, it will be more convenient to finish with the six smaller rivers which drain the tracts situated between Madras and Cape Comorin. The largest of these is the Palar, the catchment basin of which measures 8000 square miles. Rising in the Mysore plateau it runs for about 170 miles through metamorphic and tertiary rocks, with a very wide shallow bed in the lower half of its course. The rainfall by which it is fed is very uncertain, and consequently its freshets very spasmodic, sometimes coming down with very sudden and with great force, but lasting only a few hours. Endeavours have been made, therefore, to turn its whole volume to account by leading canals from it to fill a number of reservoirs, but its supply cannot be depended upon, and in a year of drought it fails. The remaining rivers are of small dimensions, and though fed by both monsoons, the freshets run off very quickly. The principal of them is the Tambrapoorney, which, though its length is but 80 miles, and its basin occupies only 1740 square miles, yet has a maximum flood discharge of no less than 133,800 cubic feet per second, owing to the large quantity of rain that falls within a short time and the rapidity with which it is

carried off. In the first 20 miles it passes through forest-covered mountains, where the annual rainfall is from 200 to 300 inches; the next 50 miles, its course is through the plain, where it is only from between 20 to 30 inches, diminishing in the remainder of its length to 18 inches. Consequently its waters are very precious, and every drop is utilised as far as possible. There are seven dams on the main river, constructed by former native rulers. The British Government has lately constructed an eighth at a spot called Streeviguntum, where there is a small discharge during the dry weather. The slope of the bed above this dam is 2·64 feet, the depth of water seven feet, and the velocity between five and six feet per second. There are two falls on this river celebrated for the beauty of their surroundings, the one near its source at Paupanassum, the other on one of its feeders at Courtallam, both of which are esteemed sacred resorts by the natives.

The remarkable feature in the river system of the Peninsula is its four great delta rivers, viz. the Mahanuddy, the Godavery, Kistna, and Cauvery, which carry off the drainage of five-sixths of the whole area. The basin of the Mahanuddy measures 45,000 square miles, and runs 490 miles from its source at Ammerkantak to the sea. In its course it receives several tributaries, of which the Tēl, or river of oil, is the largest, occupying about one-sixth of the whole basin. After leaving the highlands in which it takes its source, the Mahanuddy runs through the plains of Chatisgurh until it reaches the Eastern Ghauts, through which it finds its way by a remarkable gorge 200 miles in length, flanked by hills about 2000 feet high. This gorge expands and contracts in width, and receiving the water of several tributaries, the Mahanuddy finally debouches through an opening 3000 feet wide on to the delta, at a place called Naraje, and there bifurcates into two main rivers, which in their turn throw off several branches permeating the delta. From the peculiar configuration of the basin, the waters conveyed by the tributaries after a heavy burst of rain arrive more or less simultaneously at the main river, and are the cause of the violent floods and of the immense volume of water which is carried in an extreme fresh, and which has been calculated at as much as 1,800,000 cubic feet per second. The discharge during an extraordinary flood in rivers of such magnitude can only be arrived at approximately. If the data on which that calculation is founded be correct, the great flood in August 1866, which immediately followed on the appalling famine that desolated the province of Orissa, and prolonged the period of distress, was equivalent to nine-tenths of an inch per day over the whole basin for ten consecutive days, and in the following September of one inch per day for four and a half days. The scenery of the entire gorge of the Mahanuddy is one of great beauty, which culminates in that portion known as the Burmool Pass, where the river winds round hills 1500 to 2000 feet in height, the crags overhanging its channel, which in some parts becomes very narrow,

and where the floods rise seventy feet. The hills are covered with magnificent forest trees down to the water's edge; the ever-changing forms of the hills, the variegated foliage, the graceful bamboo intermingled with the lofty sāl, the broad-leafed teak, and the exquisitely shaped tamarind, present a lovely scene of ever-shifting beauty nowhere equalled except in the gorge of the Godavery, which is similar in all respects, except in being perhaps on a somewhat grander scale. The principal timber trees are sāl, teak, rosewood, and blackwood, all valuable for constructive purposes, and some especially suitable for cabinet manufacture. The geology of the basin is described as consisting of metamorphic rocks, sandstone, shale, with coal deposits at Talcheer, and a remarkable crystalline formation known as "the Boulder Bed." In it are found rounded pebbles of granite, gneiss, and other crystalline rocks, some of them as much as four or five feet in diameter. But few other instances of this bed are known, and it is affirmed by the Indian Geological Survey to be quite distinct from that of the "Boulder Clay" of Great Britain. The edge of the delta is skirted by a remarkable bed of hard laterite, a rock which is, I believe, found only in India, and which, when of the texture of the bed near Cuttack, is an invaluable material in the construction of hydraulic works, resisting the wearing action of water better than any other stone. The width of the Mahanuddy just at the point of bifurcation is 2½ miles. The slope of its bed through the delta commences at the rate of 1·5 feet per mile, and ends at 0·5 of a foot near the sea. Through the gorge the fall is very small in the dry season, but above the town of Sumbulpoor at its head, it increases gradually through the Chatisgurh plain up to its source. The Mahanuddy is navigable for very shallow boats of 25 tons burden nearly all the year round to Sumbulpoor, with which place a considerable trade is carried on. In the delta the two main rivers into which it bifurcates, called the Mahanuddy and Katjooree respectively, throw off eleven branches in their course to the sea. The characteristic of all delta rivers is, that they run on a ridge, and not in a valley, and so instead of draining they spread their floods over the country; the result of such action is, that owing to the velocity becoming diminished, the matter held in suspension is gradually deposited, and the beds rise, the sectional area becomes diminished, and so the carrying power of the river diminishes also, until in some instances, the original river becomes nearly effaced, and the overflow scoops out for itself a new bed in a fresh direction. The Mahanuddy having been unregulated for ages, it has come to pass that the capacity of its several branches has been so much reduced, that at half the distance from the head of the delta to the sea, they are unable to carry off between their natural banks more than half the volume entering their heads in extreme floods. Until within the last twenty years, only a desultory system of protective embankments had been undertaken, which aggravated rather than diminished the evil; but a great portion

of the delta has since then been furnished with properly aligned embankments, and in course of time the regimen of the respective rivers will become better established, and the floods will pass down them comparatively harmless. The process, however, must necessarily occupy a considerable period. The Braminee and Byturnee, as observed before, form portions of the Orissa series. They both rise in the same chain of hills. The Braminee is the larger of the two, draining an area of 9000 square miles with a flood discharge of 400,000 cubic feet per second, while the Byturnee with a basin of only one-third the area, yet has a flood volume half that of the Braminee. The same rainfall supplies both rivers. The explanation of the phenomenon of relative size of basin and of flood discharge, in these as well as in other rivers, not being proportional, is found in the relative *duration* of their floods. Thus the maximum discharge of the Mahanuddy and the Ganges whose basins measure 45,000 and 330,000 square miles respectively, or in a proportion of 1 : 7½, are nearly equal; but the duration of the Mahanuddy at its extreme height is usually only twelve hours, while the Ganges will with very trifling oscillations remain at its maximum height for a period of three weeks.

A description of the Orissa rivers would scarcely be complete without a brief notice of the province itself, which from the twelfth century up to the present time has undergone vicissitudes in flood and field, such as have seldom fallen to the lot of any country. Under its native rulers prior to that period, as far as can be ascertained, Orissa was looked upon as one of the most favoured spots in India. Dr. Hunter in his interesting work says, "for 2000 years it has been the Holy Land of the Hindoos." The town of Pooree, situated on the coast at its southern extremity, contains the shrine of Juggernaut or "Lord of the World," to whose worship crowds flock from every part of India. The whole of Orissa abounds with temples dedicated to his enslaving superstition, which is bound up with every incident of an Ooriya's life. In Sterling's 'History of Orissa' it is stated that the Mahrattas, who in the course of their career of conquest through India, found their way to Orissa, being enchanted with the multitude of its temples, the beautiful groves of trees, the number of rivers by which it is traversed, and the appearance of fertility which its vast rice plains presented, pronounced the country to be one continual "Tirth" or scene of festivity. Notwithstanding these evidences of ancient prosperity, the history of Orissa during the past century shows it to have been the scene of periodical distress, and subjected to those fearful visitations which were wont to be common, more or less, to all the deltas of Southern India, and which have culminated in some such overwhelming calamity as that which befell the province just twenty years ago, and in which three-quarters of a million of human beings perished. Happily such a calamity is not likely to occur again. The large scheme of irrigation and navigation

works which have been constructed in the deltas of that province, effectually protects its north and central tracts from both drought and flood, and by a network of navigation canals provides a chain of effective and cheap water communication both throughout its length and breadth, as well as with the capital of India, Calcutta itself, and thus the old halcyon days of Orissa may ere long be renewed in permanence, and without fear of exciting the cupidity of any marauding neighbours.

We pass on now to the Godavery, the largest and most important river in South India. The place which is traditionally regarded as the source of the river, as described in Morris's work on the Godavery district, is on a hill behind the village of Trimbak, near Nassik, in the Bombay Presidency. It is approached by a flight of 690 stone steps, flanked by a low stone wall. At the top of these steps is a stone platform built at the foot of the rock out of which, drop by drop, issues the water of the stream, and an image under a canopy has been so placed that the water trickles through its mouth into a reservoir. From Nassik it runs a course of nearly 900 miles right across the Peninsula to the sea, into which it discharges its waters by several mouths along a coast-line of 60 miles, stretching from the port of Coringa on the north to Narsapoor on the south. Its catchment basin measures roughly 120,000 square miles, and comprises within its area a large variety of geological formations, viz. metamorphic sandstone, limestone, trap, laterite, coal measures, and alluvium. It receives five great tributaries, all of which, with the exception of the Manjhera, drain the northern part of the basin. The Manjhera for the most part, as well as the main river itself, passes through the State of Hyderabad. The rainfall over the entire basin is due to the south-west monsoon, and varies from 30 to 50 inches, and the maximum flood passing the site of the great weir at the head of the delta is calculated at 1,350,000 cubic feet per second, at which, with trifling oscillations, it remains for about a week before commencing to subside. From March till the middle of June the volume in the river is only about 3000 cubic feet, and in a very dry year somewhat less. The four great tributaries which drain the northern part of the basin are the Poorna, the Pranhita, the Indrawatti, and the Sabbery. The first carries off the water which falls on the slopes of the Ajunta Hills; the Pranhita conveys the accumulated drainage of 40,000 square miles brought by the Wardha, which rises in the Satpoora range, and is 250 miles long; the Paingunga, which rises in the hills south of Berar, and after 320 miles falls into the Wardha above Chanda; and lastly the Waingunga, whose source is at Ammerkantak, and which, after a course of 430 miles, joins the Wardha at Talhodi. The Pranhita itself, after the junction of the last-named river, is about 90 miles long to Sironcha, below which it falls into the Godavery. The next tributary is the Indrawatti, 300 miles long, and the Sabbery, both

of which rise in and drain 37,000 square miles of the hilly tract of Bustar, one of the wildest and least civilised portions of country in the Peninsula.

Below the junction of the Sabbery, the Godavery enters a most remarkable gorge, fifty miles long, and somewhat similar to that of the Mahanuddy, already described. In one part of this gorge, where the river is not more than 250 yards wide, the hills on either side rise nearly abruptly 2500 feet. This narrow pass is about nine miles long, and in it the floods rise 80 feet above the summer level. At the end of the pass the river takes a sudden bend, nearly at right angles, and as the rocky slopes project below water far across the river, a tremendous whirlpool is created at the top of an extreme flood, so dangerous that vessels are obliged to wait above the pass until the river has subsided a little before venturing through it. The depth in the gorge at low-water level is over 100 feet, so that the bed of the river there must be 50 feet below mean sea. There are several singular characteristics about the Godavery; one is its small average fall from its source to the sea. Below Nassik the country is about 1200 feet above tide-level, and so the slope of the Godavery averages about 1·25 feet per mile; but at certain points in its course there are rocky barriers and rapids. It follows that in the intermediate reaches the fall is not much more than six inches per mile, while in the gorge just described the water is practically level after the floods have subsided.

At the end of the gorge at a place called Palaveram, 60 miles from the coast, the river enters the deltaic formation, though the head of the delta itself is 25 miles lower down. The level of the land at Palaveram is 80 feet above the sea, and has a regular slope commencing at $1\frac{1}{2}$ feet and ending with one foot per mile. The rise and fall there is 38 feet, so the summer level is only 42 feet above sea, and that of the bed at the nearest ford 38 feet. The slope of the river bed, however, is not regular like that of its banks, but is broken up into pitches and pools, some of which are 30 feet in depth. The average slope, however, from the foot of the hills to the sea, is only $7\frac{1}{2}$ inches per mile in a direct line, and following the windings only $5\frac{1}{4}$ inches per mile. The breadth of the river varies from 2000 to 6000 yards, inclusive of islands, which occupy about 1500 yards at the delta head. At this point the Godavery divides into two main branches, the northern one discharging its main volume into the sea, sending a small branch into Coringa Bay. The southern branch empties itself into the Bay of Bengal, a few miles below the town of Madapollam, where there was formerly a large cloth factory, which gave its name to the particular kind of cloth well known to English merchants. At 28 miles from the head of the delta, the south branch is subdivided, and a branch flows directly to the sea. The intermediately enclosed tract, known as the Nuggarum Talook, is the most fertile spot in the delta, where exceedingly fine sugar-cane

and other garden produce is grown. For the irrigation of this tract, a large aqueduct, 800 yards long, was thrown over the river in order to carry the water brought by a canal from the delta head. As the Godavery during the season of flood carries in suspension about $\frac{1}{1100}$th in bulk of solid matter, it has been calculated that about 200 million cubic yards of material must be deposited annually, or sufficient to cover 66 square miles one yard deep. As an illustration of the rate at which the delta formation has progressed, it was found some years ago, when it became necessary to raise the lighthouse which was originally built at the water's edge, that land to the width of two miles had been formed beyond it, and that Point Godavery had extended nine miles to the north in thirty years.

Between the sea and the town of Chanda in the Central Provinces, 648 feet above tide-level, a distance of 400 miles, there are three rocky barriers at which many feet of the river slope is concentrated. This circumstance admits of the reaches between them being easily navigable in flood, as well as during the low-water season. The barrier below Chanda, known as the third, when approaching from the coast, is the most formidable, being 40 miles long, which, though with some difficulty ascended during the period of flood, is impassable as soon as it begins to fall. After this barrier, there is a stretch of 38 miles to Sironcha, which is 406 feet above tide-water, easily navigable; the slope of the bed being only six inches per mile. Below this reach, there is another barrier of rock, known as the second or Enchampilly barrier, at which the fall is concentrated within a short distance. From thence to the first barrier, a distance of 70 miles is easily navigable at all times as far as Dumujudieur. At certain stages of the flood the first barrier could be safely navigated, as also the reach below it as far as Budrachellum, a shrine of sanctity much frequented by pilgrims from all parts of India.

From Budrachellum to the sea, 150 miles, the river is navigable at all seasons of the year for boats of light draught. As Chanda is a great commercial mart, to which much of the produce of the Central Provinces is conveyed, it was considered most important to place it in direct connection with the coast by means of the Godavery, so that the cotton and other valuable products of the Central Provinces, including coal, might be transported for shipment at a very low cost. After much deliberation, the Government of India gave its sanction to a scheme for rendering the Godavery navigable as far as Chanda by steamers. The works at the first barrier, consisting of a weir across the rocky bed, and a canal parallel to the river bank, were nearly completed, and those at the second barrier started, but the difficulties in the way of climate, labour, and supplies proving much greater than had been originally anticipated, and the expense consequently much heavier, the Government, after expending 750,000*l*., got disheartened, and decided on

abandoning the project, and so sacrificing that large sum of money. That decision was, in the opinion of many qualified judges, most unfortunate. The difficulties, though undoubtedly great, were by no means more serious than those which have been successfully encountered on many of the railway lines. There were no works, either in magnitude or cost, like the great bridges thrown across the rivers in the north-west and Punjaub, and the Indus at Attock and Sukkur, and as each succeeding barrier was overcome, the labour for proceeding with the rest would have been greatly lessened. Moreover, as each reach of the river became improved, immediate use could and would have been made of it by traders for the conveyance of produce to the coast, as the whole of the cotton and wheat-producing districts in the Central Provinces would have been put in cheap communication with an excellent harbour on the coast. The more immediate reason alleged for abandoning the Upper Godavery Navigation works was that the river passed through a considerable length of barren and unproductive country; yet at this present time, after an interval of nearly thirty years, the Government are favourably regarding the project of a railway from Nagpore to Calcutta direct, to effect the very object for which the improvement of the Godavery was recommended and commenced, viz. to reduce the cost of carriage for the wheat of the Central Provinces. It will scarcely be credited that this line of railway, after leaving the wheat plains of Chatisgurh, will pass through 200 miles of more or less dense forest and utterly unproductive and uninhabited country. The distance of Nagpore to Calcutta is twice that from Chanda to the sea by the Godavery. The railway rate for wheat is to be one-halfpenny per ton per mile. By the river route it would be carried for at least half that rate, if not for one-fourth, three-eighths of a penny being the charge for produce transported by the clumsy native craft on the delta canals. It is easy to see what a difference such a rate would have made to merchants in dealing with that produce in the present seriously disturbed state of the exchanges between India and England. Moreover, the port dues in Calcutta are exceedingly heavy. At the port of Cocanada they are exceedingly light, so that there would be that additional gain to the shipper. I cannot guess what the railway may cost, but the above-mentioned sum of 750,000*l.* distributed over the 270 miles of river now navigable, gives a rate of 2800*l.* per mile. If double that sum was expended over the remainder of the distance to Chanda, it would still be much less than a double line of broad-gauge railway can possibly be constructed for through the country to be traversed between Raipoor and Calcutta, while the working expenses would be very much less, in fact quite small. One of the most important articles to be conveyed from Chanda is coal, which, if carried by the river, would prove a valuable item of trade, inasmuch as the coasting steamers and the railway lines in the Madras Presidency would be so supplied more cheaply than from any

other place, as there is inland water communication all the way to Madras by means of the Buckingham Canal.

Any description of the Godavery would be incomplete without a notice of the great irrigation scheme designed and carried out by Sir Arthur Cotton, and which though suggested by the Cauvery works, greatly exceeds them in vastness and completeness, for it has coupled with it a network of about 500 miles of navigation lines, in which the Cauvery works are deficient. Shortly described, the Godavery scheme comprises a weir at the delta head 4000 yards long and 14 feet high, from which three main canals with several branches and a ramification of distributaries are taken off for watering the three divisions of the delta. The irrigable area is reckoned at 800,000 acres, of which about 600,000 are now irrigated. The capital expended up to date has been nearly one million sterling for irrigation, drainage, protection from floods, and 500 miles of navigation, being at the rate of 24*s.* per acre. The water rate collected from the whole area averages about 6*s.*, less 1*s.* 6*d.* per acre for working expenses, leaving 4*s.* 6*d.* as the net annual return, or nearly 20 per cent. In the great famine of 1833, the Godavery district was nearly decimated. The construction of the irrigation works has not only rendered famine impossible within its own limits, but admits of the district contributing its surplus produce to the relief of any other locality that may be suffering from scarcity, to say nothing of the improved condition of the inhabitants arising from the amount of bullion annually thrown into the district in return for the produce exported.

The river next in order and importance is the Kistna, whose catchment basin measures roughly 97,000 square miles, and whose geological formation consists of metamorphic and sub-metamorphic with laterite, limestone, and carboniferous rocks. Rising north of Sattara in the Bombay Presidency, it runs a course of 800 miles, entering the sea 35 miles south-west of Masulipatam. The fall of its bed is greater than that of the Godavery, averaging 3½ feet per mile, but it is also broken up into reaches by barriers at intervals. It has several feeders on the north, the largest of which are the Bhima and Sina, which join each other at Sholapoor, and flow thence into the Kistna near the town of Raichoor. The fall on these tributaries is 2·75 feet per mile. The great feeder on the south is the Tungabaddra, which has a length of 213 miles, joining the Kistna about 80 miles below Kurnool. Its catchment basin measures 11,000 square miles, and is drained by four rivers, the Tunga, the Buddra, the Choardi, and Wardha, whose sources are in the Western Ghauts, on which there is a rainfall of 135 inches, and a fifth the Baggri, which drains a lower range called the Bababooden Hills and the plateau of Mysore. One characteristic of the Tungabaddra is the sites which exist on it and its feeders for the formation of gigantic reservoirs at a comparatively small outlay. It will be sufficient to indicate one of these which exists at a point on the river 20 miles

above the ancient city of Beejanugger, where the slope of the bed is so gentle that a dam 100 feet high would throw the water back nearly 90 miles, and impound 5000 millions of cubic yards at a comparatively small cost, and at a level which would command all the tanks in the district of Bellary and the Carnatic, and so ensure their being supplied even in years of drought, and thus render a famine such as the last impossible.

Like the Godavery, the Kistna flows through a precipitous gorge before it enters the plains of its delta, but this gorge is not navigable. The town of Bezwada at the head of the delta, 60 miles from the sea, is the site of the great weir 1300 yards long and 16 feet high, which feeds the delta canals taken off on either flank. The maximum discharge in the great flood of 1882 is calculated at 807,500 cubic feet per second. The characteristics of the Kistna resemble those of the Godavery generally, it likewise having two distinct high freshes in the months of July and September, but they rise much more suddenly and quickly at Bezwada and remain up for a shorter time. In its deltaic portion, the river overflows its banks, and has to be restrained by marginal embankments. The delta formation is not quite similar to that of the Godavery, as the tract corresponding to the central delta is of a much smaller area and situated further from the head than in the Godavery. Though the Kistna has so large a flood discharge, there is a very short supply during the dry months. Moreover, there is no port worthy of the name at any of its mouths. All the traffic is taken along the canals to Cocanada, which is now the great place of shipment for the produce of the two deltas, which adjoin each other at the Colair Lake, a large depression covering about 200 square miles, and evidently reclaimed from the sea while the deltas were in process of formation. There is a very important scheme of irrigation works from the Kistna also; the irrigable area is estimated at 475,000 acres, of which about 300,000 are already irrigated. The scheme is not yet complete, but when finished the capital cost per acre will probably be about 40*s*. The Kistna works have already returned about 14 per cent. on the outlay.

A little lower down the coast is the small delta of the Pennar. This river rises in the Mysore plateau and has a catchment basin of 21,400 square miles with a length of nearly 300 miles from its source to the sea. It receives five principal tributaries with whose united discharges the maximum flood amounts to 221,000 cubic feet per second. The character of its floods is essentially torrential, rising and falling very rapidly. Its basin is composed of metamorphic, sub-metamorphic, laterite, and limestone rocks. In the valley of the feeder Kundar, are the once famous diamond mines, which, however, are not now worked. It is into this feeder that the waters of the Tumbaddra have been led by the Kurnool irrigation scheme. Owing to the spasmodic character of its floods and the absence of water in the dry weather, the canals

from the Pennar are designed for the purpose of filling the large reservoirs originally constructed by native rulers, from which the water is led to the fields.

Last, but not least in importance, is the river Cauvery, which rises in the Western Ghauts, and whose catchment basin measures 32,00ℓ square miles, comprising within its area metamorphic, upper tertiary, and cretaceous rocks. Its length is 472 miles, and it has the advantage of being fed by both monsoons. The freshes commence in the middle of June and reach a fuller stage in the middle of July, lasting till the end of August. In September it is again low, but in October there are small freshets, which become heavy floods in the middle of November, after which the volume diminishes gradually till March, between which and June the supply is very small. The discharge of the Cauvery in a maximum flood above the weir is 284,000 cubic feet per second. It is fed by five principal tributaries which fall in above the city of Seringapatam, the capital of Mysore, and of the renowned Tippoo Sahib, whose defeat of the British force is commemorated in a quaint fresco on the walls of the palace, an exact copy of which is exhibited in the Indian Court of the London Exhibition. Not far from Seringapatam, at a place called Shīva Samoodrum or the Sea of Shīva, are to be seen the splendid falls of the Cauvery, which at certain stages of the flood are a magnificent sight, and ought to be visited by every traveller in India. The slope of the Cauvery's bed is generally steeper than that of the Godavery or Kistna, and as it flows through the district of Coimbatore in a rocky bed, its waters have been utilised for irrigation for centuries. Immediately above the dam at the head of the delta, the slope of the bed is 3·2 feet per mile, but there the Cauvery throws off the Coleroon, whose fall for 20 miles is about two feet per mile, decreasing thence to one foot till it reaches the sea. The Cauvery itself running on a high level and falling 1·6 feet per mile led to its being utilised as an irrigating river, its entire volume being subdivided amongst smaller channels. The Coleroon receives the overflow of the Cauvery in flood, as well as the drainage, and its waters are picked up by a second weir and system of canals about 30 miles from the coast. The system of irrigation from the Cauvery is the type on which all the more recent deltaic works have been modelled. It is of very ancient origin, and considering the absence of all scientific knowledge in those early times, the manner in which the Cauvery works were designed and carried out, shows what an aptitude there must have been in the natives of India for turning natural advantages to account; for though the more obvious defects in the original works have been remedied by the Government engineers, and the whole system, including distribution, flood and drainage works, have been brought under thorough control, yet the scheme as a whole remains as originally laid out. The expenditure incurred by the British Government has amounted to only 112,000*l*. The irrigated area has

risen from 546,000 acres in 1832 to 822,000 acres, yielding a revenue of 420,000*l.*, and sustaining a population of 540 to the square mile. It is greatly to be regretted that no model of a delta river with its irrigation scheme is to be found in the Indian Exhibition, as the models of such isolated structures as have been sent home afford no idea whatever of a complete delta scheme, and no better illustration of the intelligence of the natives of India could be found than that of the Cauvery irrigation works.

A paper on the river system of South India would be incomplete if a brief statement were not given of the value of the water carried by those rivers, both for irrigation and navigation purposes. The rainfall over the whole Peninsula, as has been explained, is limited to little more than four months in the year, and not only so, but it is at the same time fitful and precarious, so that, with the exception of that which falls on the Western Ghauts, no dependence can be placed thereon; hence, for those crops which can only be grown by irrigation, amongst which is rice, the staple food, water must either be stored or drawn direct from rivers, whose volumes, though varying, are nevertheless always more than sufficient to irrigate the lands within their influence. This circumstance has given rise to the enormous system of reservoirs, locally termed tanks, which exist all over Southern India. But where these are dependent on only the local rainfall, they must and do fail in a year of drought, and therefore the crops dependent on them perish. Hence, wherever there is a river in the Peninsula, it is utilised more or less either for filling storage reservoirs, or else, as in deltas, for irrigating the land directly by means of perennial canals. As a general rule, it may be said that, in addition to eliminating the element of uncertainty as to rainfall, irrigation doubles the weight of crops off the same land, and where land, for want of a reliable supply of water, can only be sown with what in India are termed "dry crops," of inferior value, its conversion into irrigated land, bearing valuable crops, increases its productive value three to fourfold, and its saleable value in proportion. The expression of that value in sterling money will vary according to the description of works by which the water is obtained. In the Godavery delta, for irrigation, drainage, protection from flood, and navigation, less than 1,000,000*l.* have been expended. The interest of that sum amounts to about one shilling on land consuming from 6000 to 10,000 cubic yards per acre, the working expenses are one shilling and sixpence, while the receipts from sale of water alone from 600,000 acres average six shillings per acre, assuming the value of the rupee for simplicity's sake at two shillings. Water delivered from tanks is more costly, varying from six to two shillings per acre annually, while lands irrigated from wells 15 to 20 feet deep cost for an equal amount of water 40 shillings per acre. As respects navigation, the value of water may be estimated by the difference in cost between land and water carriage.

The present charges made in India on existing canals are no sufficient criterion by which to judge of their relative economy, because, first, the canals are, with few exceptions, not adapted for steam traffic, and secondly, they are mostly lines in isolated positions. On properly designed and effectively worked canals in England, America, and the Continent of Europe, the cost has been reduced to a very low figure, as, for example, on the Aire and Calder Canal, one out of several instances cited before the Parliamentary Committee in 1883, where it was stated the cost was only one-thirtieth of a penny per ton per mile. What is possible in England ought surely to be practicable in India, but allowing that the cost be not reducible below one-eighth of a penny, while carriage by the road is threepence, and by rail one-halfpenny, the value of water for navigation is at once apparent. But in proportion to the distance to be traversed, does the cheapness of carriage become necessary. Take for instance the very case already alluded to, that of the conveyance of wheat from the Central Provinces to the coast: whether it is carried at a charge of one-halfpenny per ton over 600 miles of railway, or one-quarter or one-eighth of a penny per ton over 400 miles down a river, will make a difference of 25*s.* to 50*s.* per ton, or of 8*d.* to 1*s.* 6*d.* per bushel, sufficient to turn the scale in favour of Indian wheat in the English market at all times. But without marshalling an array of figures, it is sufficient to aver generally, that cheap rates for carriage create a trade in all kinds of bulky articles of low value, which otherwise would never move at all, and that it is especially true of a poor country like India, where raw produce is small in value, great in bulk, and requires to be transported long distances from the place of production to the port of shipment.

In conclusion, the question naturally arises, what has the British Government in India done, and what is it still doing towards utilising the enormous wealth which it possesses in its magnificent rivers? In the Peninsula, it has done much in covering the deltas with a complete system of works; it has likewise turned many of the minor rivers to account by improving the old native works, increasing the efficiency of the channels, and enlarging the capacity of the reservoirs. But it has done very little yet in utilising the upper waters of the great rivers. Towards the prevention or mitigation of famine, it has extended its railways with a view to transporting food from localities where it is in abundance to where it is wanting. So far well—but railways cannot produce food, neither will they serve to keep cattle, which are the sinews of agricultural operations, alive in time of drought. The ordinary trade of the country becomes disorganised by the necessity of employing all the available rolling stock of various lines for the transport of food in one special direction, and at the end of the famine, such agriculturists of the famine area as have been kept alive find themselves alive truly, but oftentimes reduced to penury; first, by the loss of their cattle for want

of pasture, and next by having had to purchase food for themselves at scarcity prices. On the other hand, by storing a fractional portion of the surplus water which now runs to waste in the ocean, the greater portion of the Peninsula at least may be rendered independent of the caprice of seasons, and food grown on the spot can then be sold at the ordinary prices, while the cattle will be supplied with fodder and water, and so be preserved alive and in condition. Storage sites, such for instance as that existing on the Tungabaddra, can be found on some of the feeders of all the great rivers, whose supply never fails, and at an elevation which will allow of their waters being carried to all the existing reservoirs on the plateau and plains of South India. About 22 millions sterling have been spent by the Government on irrigation works throughout India, of which perhaps one-fourth has been laid out in the Peninsula. An equal sum expended in storage works in suitable localities and in completing and perfecting river and canal navigation would effectually secure every portion of the Peninsula from any future visitation of famine, and place the lives as well as the material well-being of its inhabitants beyond jeopardy thereafter.

The Place of Geography in Education.

By DOUGLAS W. FRESHFIELD, SEC. R.G.S.*

THE President of our Section, Sir F. Goldsmid, in his opening address, has already called your attention to the place of geography in English education. The subject, however, is so important that it will bear to be returned to. In Parliament, when any bill is proposed in earnest, it is made the subject of a second reading. In the Parliament, or a Committee of the Parliament, of Science, it seems proper that we should fully discuss the measures lately proposed by the Council of the Royal Geographical Society, for obtaining for their science that recognition from the heads of English education which it already receives abroad. It seems expedient that you should be urged to give them (in so far as they may commend themselves to your judgment) your support, both as individuals and collectively as a branch of the British Association.

I have therefore undertaken, as one of the Secretaries of the Royal Geographical Society, to bring them again, and more in detail, before you to-day.

Before we discuss the place of geography in English education, it is perhaps well that we should, if possible, come to an agreement as to two things, What is the aim we propose to ourselves in our national education? and, What do we mean by geography?

* Read in the Geographical Section of the British Association, Birmingham, September 3rd, 1886.

The only sensible and practical—to use two adjectives dear to the commonplace mind—the only sensible and practical view of *Education* is assuredly that which defines it as such a calling out of the capacities as will enable the pupil to play his part in the world to the advantage of himself and his fellows, that is, his family, his countrymen, and humanity.

Geography, I should submit with equal confidence, is the comprehensive name for the study of man's physical environment on the surface of this planet and of the interaction between it and the human race.

Geography co-ordinates the sciences which deal with different classes of natural objects, such as anthropology, zoology, botany, geology, meteorology. It supplies a frame in which to exhibit and review the local relations and interaction of these natural sciences. It is in one sense an introduction to all these sciences. Again, it enables us to appreciate the reciprocity between the physical constitution of countries on the one hand, and the development of their people and States on the other. It thus forms the transitional and connecting link between the natural sciences and history, while, as giving an account of the physical conditions which controlled the lives of their producers, it forms a key and an invaluable commentary to letters, is closely connected with medicine, explains the origins of architecture, and has even connections with law.*

The value of geography at the present day as a link between the natural sciences and the historical seems to me exceptional. We are divided into two camps. I am not a partisan of the exclusively "modern side." I think an education based solely on physical science, which leaves outside the history of moral ideas, and the works of the great masters of thought and language, is a narrow and deleterious education. To cite one of its lesser evils, how much of the literature of physical science is rendered unreadable by the absence of the art of letters in its producers? "Scientific English" has become almost a proverb. The Classics are the authors and models of the art of clear and condensed expression for European literature; they were so used by the early physicists, and it is surely well for all who can to study them.

But if I am not one of its partisans, I am a believer in the modern side to this extent, that I hold that the old-fashioned classical education which ignores physical science—ignores even its relations to its own subjects—such as I had myself, is deplorable, and a drawback of no slight weight in after-life. Now between these rival camps of educationists, it seems to me that geography steps in as the mediator and uniter. It

* With international law, of course, geography is largely mixed up. The shifting of streams has given rise to many questions, and the recent retreat of alpine glaciers has led to curious and abstruse legal discussions in the various States concerned, the point appearing to be whether the glacier's invasion has extinguished the right of the heirs of the former proprietor.

forms (I repeat the phrase of the Kriegsakademie of Berlin) "the connecting link between natural science and history." It should be taught mainly and primarily, in schools, from the physical side, but the teachers of other subjects (if they are competent to the task, which at present they frequently are not) may exhibit their geographical relations.

Geography works in different ways: the first and simplest, in the observation and arrangement of facts relating to a selected area: the description of a country: in this sense all books of travel ought to be geographical. Or it may select and isolate its facts with regard not to locality, but to their individual character; it may collect all that is known of mountains, of volcanoes, of glaciers, of ocean-currents, or lake-basins. Provided with these conveniently arranged bundles of facts or pictures, it goes on to investigate their relations. What influences produce variations in the snow-level? What effect on the development of civilisation have inland seas, where land is constantly in view; a coast full of fiords? Or it takes the single fact in its relation to humanity. How the physical configuration of Italy and Greece—the position of the Alps and Apennines in one case, the breaking up of the country into more or less isolated basins between hill and sea in the other—affect their history?

If you doubt my judgment on this matter of the sphere and importance of geography, I may quote in support an historian, and a politician who is also an historian.

"The study of geography, small as is the part allotted to it in actual teaching, is one which must occupy a foremost place in any rational system of primary education. When the prejudices and traditions of our schools and schoolmasters have passed away—as they must pass away before a truer conception of the growth of a child's mind and of the laws which govern that growth—the test of right teaching will be found in the correspondence of our instruction with the development of intellectual activity in those whom we instruct. The starting-point of education will be the child's first question; and the child's first question is about the material world in which it finds itself. . . .

"Studied properly, geography would furnish a groundwork for all after-instruction. It is, in fact, the natural starting-point for all the subjects of later training. History strikes its roots in geography; for without a clear and vivid realisation of the physical structure of a country, the incidents of the life which men have lived in it can have no interest or meaning.

"Through history, again, politics strike their roots in geography, and many a rash generalisation would have been avoided had political thinkers been trained in a knowledge of the earth they live in, and of the influence which its varying structure must needs exert on the varying political tendencies and institutions of the peoples who part its empire between them. Nor are history and politics the only studies which start naturally from such a groundwork. Physical science will claim every day a larger share in our teaching, and science finds its natural starting-point in that acquaintance with primary physics which enables a child to know how earth and the forms of earth came to be what they are. Even language, hindrance as its premature and unintelligent study has been till now to the progress of education, will form the natural consummation of instruction when it falls into

its proper place as the pursuit of riper years, and is studied in its historical and geographical relations.

"Such a dream of education will doubtless long remain a dream; but even as a dream it may help to realise the work of geography, and to look on the study of it in a grander as well as more rational light than has commonly been done."*

"Shall we who are in nature not know nature?" says an old geographical writer. Shall we English who inherit so large a part of the world not acquaint ourselves with our inheritance and the conditions under which we can retain and make the most of it? What has been the fate of our race? to be the greatest rulers and merchants and colonisers the world has ever seen, the restorers in Asia of broken-down civilisations; the creators in the new worlds of North America and Australasia of Greater Britains peopled by our own descendants; the sharers in Central Africa, to an extent as yet undetermined, in the bringing into relations with civilisation and commerce of the dark millions of the Congo. Probably in the future, unless our statecraft miscarry again as it did in the last century, we may find ourselves the centre of a vast confederation strong enough to ensure the peace of the world, to maintain a *pax Britannica* which neither Slav nor Latin will venture to dispute. Do you think we are educating our children for this high destiny—this possibility—by leaving them in comparative ignorance of the earth's structure, of the natural laws by obedience to which they may go forth and win peaceful victories and fill up the void places of our planet? The problem of our age and country is the better distribution of Britons through British lands. This, unless our population becomes stationary, is the only cure for that suffering for which Lord Mayor's Funds, Charity Organisations, and the like are mere temporary anodynes. Is it well then that we should leave the knowledge of our British lands out of our education, primary or other? Is it wise that we should have to turn to the Collège de France for a programme of thirty lectures on the British colonies of Australia?

But there is very little use in declaiming, or even arguing, on any subject whatsoever, unless one has to some considerable extent entered into the mood and meaning of one's antagonist. The judicious missionary—there are many such now—who desires to civilise or convert the heathen, does well to catch his heathen first, look into his superstitions and prejudices, before preaching at him. I have no difficulty in catching my heathen, for I count some old friends among them, and I can therefore speak of them with more freedom than I would take with perfect strangers.

I propose to divide the objectors to geography in education under three heads. First there are those who know too little, and then there are those who know a great deal too much.

* S. R. Green, Preface to 'A Short Geography of the British Isles.' See also Mr. J. Bryce's letter, 'Educational Reports R.G.S.,' p. 154.

In the first class I include all those who believe (and they generally have the excuse of their own education for the belief) that geography is only an equivalent for topography—that geography consists of nothing but tables. This no doubt was the old system. But if it is old, it has been anciently discredited, as long ago as the time of the Antonines. Apuleius, in the preface to his treatise De Mundo, declaims against the tourist who will describe nothing but the "Amœnitates et magnitudines montium," as if there had been an Alpine Club in his day; and against the teachers who "sola et singula exstruunt," and do not treat phenomena in classes—against topography, that is, as against physical geography. Mr. Green has described it beautifully:—

"No drearier task can be set for the worst of criminals than that of studying a set of geographical text-books such as the children in our schools are doomed to use. Pages of "tables"—"tables" of heights and "tables" of areas, "tables" of mountains and "tables" of tablelands, "tables" of numerals, which look like arithmetical problems, but are really statements of population; these, arranged in an alphabetical order or disorder, form the only breaks in a chaotic mass of what are amusingly styled "geographical" facts, but which turn out simply to be names, names of rivers and names of hills, names of countries and names of towns, a mass rarely brought into grammatical shape by the needful verbs and substantives, and dotted over with isolated phrases about mining here and cotton-spinning there, which pass for Industrial Geography. Books such as these, if books they must be called, are simply appeals to memory; they are Handbooks of Mnemonics, but they are in no sense Handbooks of Geography."

In my day there were many boys at public schools who acted consistently, and not altogether unsuccessfully, on the principle that whatever was not a city in Asia Minor was an island in the Ægean Sea! Of course geography may be made barren. To the dull all things are dull. But so may the Bible! The worthlessness of divinity is not proved by the fact that examiners have existed capable of demanding a complete list of the kings of Judah and Israel. I have always surmised that the cautious undergraduate who replied that unfortunately he could not at the moment remember any king of Judah or Israel, had a deeper purpose than to confess his own ignorance.

The educational value of geography is not to be decided off-hand by a head master who thinks "The subject is merely a question of memory. We cannot make a discipline of it or set problems in it" (Report of the Royal Geographical Society's Inspector, p. 92); or by people who still expect children to gabble over the names of the smaller rivers of China, or the Pashalics of Asia Minor, before they understand the elements of physical geography, or have a single idea about the United States or Australia.

With this first class of objectors it seems to me we have no difference, only a misunderstanding. We and they unite in denouncing—in accepting Mr. Green's denunciation of "geographical text-books such as

the children in our schools were condemned to use" ("nearly useless—mere gazetteers," a head master calls them, p. 91). We have simply in talking about geography been using the word in two completely different senses.

Now I come to a more formidable tribe of objectors, those who know too much. Their objection is plausible and insidious. They do not say that there is no such thing as a geography capable of being taught. Far from it. But they urge that all natural science is geography, and that as they themselves—the scientists—already collectively represent all natural science to their mutual satisfaction, the geographer has no place—is a superfluous luxury.

If the geographer has any speciality—so they argue—it is that he describes or depicts appearances without seeking out causes and connections, that he is no philosopher, but a poor sort of artist-thing—and here they break into a humorous and patronising smile—"Yours is not a *logy*, only a *graphy*."

Now this assertion that geography has nothing to do with reasoning—is simply observation—though sometimes quite gravely made, is a pure fiction, based on a wretched little verbal quibble, and with no other foundation whatsoever. If we are called *graphers* and not *logists*, it is because our science is not of yesterday, but springs from those early days of humanity, before geology was born or even thought of, when to picture the fact as accurately as might be was held a preliminary to reasoning about its causes. There has been, it occurs to me, and I think here I shall have the support of Professor Bonney, a good deal of reasoning about mountain structure and ice action and lake-basins of late years in which the picture of the appearances in the writer's mind has seemed to be rather a fancy one—subjective, Turneresque, anything but realistic in short.

A Forbes and a Darwin teach us the mutual places of observation and reasoning; but it is not every scientist nowadays who has their severe self-control and clearness of vision.

Brought to the test scientifically or practically, this pretension of other sciences to exclude geography from the great game of "What and Why" breaks down pitiably. The influence of locality is a study in itself. If I want a compendious description of any region or country, to whom shall I go but to the geographer? If I want to know what botanical and physical phenomena are concurrent, I must go to the same quarter. He will give me such a picture of a country as an intelligent traveller—say rather resident—might supply; he will show how the physical conditions have acted on its inhabitants, its plants, its animals. The practical value of such information in commercial pursuits needs no demonstration. Moreover, a sound course in physical geography will lay the basis, in pupils whose minds run in this direction, for the pursuit of the several branches of the physical sciences.

As to geology, which is perhaps the most forward of the would-be "chuckers-out" of geography from the Hall of Education, its claims are perhaps the least tenable of all. Archæology might as well claim to be equivalent to history, history to political economy, or surgery to medicine, as geology to geography. A geologist is as incapable of giving any complete picture of a country, as an archæologist is of a period. A geological diagram is quite a different thing from a geographical picture, as different as an anatomical diagram from a portrait. His science leaves off where ours begins. His results are often portions of our premisses. Of course I do not dispute that geography and geology may meet, that their boundaries overlap. Take that question of lake basins. But even here may not geology gain by having its puzzle handled from a geographical point of view? If we put the question thus: Account for the fact that there are lakes and tarns in numbers in the Alps, tarns only in the Pyrenees, and neither lakes nor tarns in the Caucasus; does not this throw a little light on the matter, narrow at least the field of tenable hypothesis?

Finally, we have a third set of objectors to deal with. For I shall pass over those who still say that geography does not "pay." If this allegation were wholly true it would be the essence of our case. But I would warn them in passing that it is no longer wholly true. For what is justly held in private schools as an end and object of education, getting a boy on the foundation of Eton, geography may prove more useful than they think. I say this having in my pocket one of the last examination papers, in which there are several excellent geographical questions. Geography, they admit, is vastly important; but its many-sidedness, they allege, renders it impossible to teach. You cannot, they say, produce any definition of it which can be accepted as a practical subject for a course of lectures or a school-class. The difficulty of these gentlemen *solvetur ambulando*—will be relieved by a short tour. If they do not accept Mr. Keltie's Report, if they are at all serious persons and mean to use their influence seriously against our proposals, let me pray of them, before they take any further steps, to go to school in Canton Zürich, and to college at Breslau under Professor Partsch, or at Göttingen under Professor Wagner.

The practical test of experience will be conclusive with most practical Englishmen. In educational matters all our critics, from Mr. Matthew Arnold downwards, admit that Germany holds her own, understands her business. Do the Germans find professors of geography superfluous ornaments? Do they experience the slightest practical difficulty in finding them, or defining them, a field to work in? Why, they have twelve university professors of geography, and are yearly adding fresh ones. The Minister of Public Instruction is recommending it strenuously to the schools. The same thing may be said of France and Switzerland. And what do we find are the results brought about

by this system? The German book of travel or magazine shows a more cultivated and better directed power of observation. The younger generation of German merchants and clerks are beginning to steal marches on us by their superior intelligence and training. The German soldier has learnt to read maps so that not only officers but every third man in the ranks on a campaign is supplied with one. It is hardly conceivable in England how many people cannot point out to you on a map a cross-country route or explain the meaning of a contour line.

The Germans find, moreover, geography not only an essential part of a scientific education, but a most useful and illuminating adjunct to the Literæ Humaniores. Professor Partsch of Breslau cites as a typical example of the spirit of German work, the newly published 'Physical Geography of Greece,' by himself and C. Neumann. "In this work," he writes, "comes into more than usual prominence the appreciation of the influence exercised on the state and conditions of culture in a country by its physical character." Darwin's 'Voyage of the Beagle' and the second book of Herodotus are mentioned together as future text-books.

"I once," he says again, "selected the Western Alps as the subject of my course. The very erroneous map of the Piedmontese Staff offered occasion for a critical review of maps and for an appreciation of the work more particularly of English travellers in settling the topography of the Graian Alps. The arduous controversies respecting the history of the passes in Roman times, more particularly as to Hannibal's Pass, were taken into account with reference to historical sources. An estimate of the present relative importance of the passes followed naturally."

We may be quite sure that at Breslau they did not, like a recent text-book, forget the Col de l'Argentière and the Petit St. Bernard among the passes, or like the reader of history at Oxford, boldly assert that the latter pass was even lower and easier and more direct than the Mont Genèvre as a route from Valence to Turin.

The connection between geography and the classics might be—perhaps is in Germany—carried further into the regions of pure criticism. The poets, ancient and modern, Homer and Aristophanes, Virgil and Catullus, Wordsworth and Tennyson, are many of them sensitive to their physical as well as human environment, and the best of describers. Mythology, even admitting Mr. Lang's brilliant criticism of much modern exposition, is full of physical geography. The poet's epithets are sufficient proof that the Greeks were not colour-blind. To read Plato we must realise the scenery and climate of Attica. And in mere verbal criticism take such instances as these. The epithet *horrida* applied to a valley puzzles Virgilian critics. Defiles in the Italian Alps are generally known as *orridi;* is there no connection?

Ovid talks of

"rapidas limosi Phasidos undas"—

"swift and muddy"—an unhappy collocation, says Mr. Dryasdust—but a fact, as those who went to Caucasia while steamers ran on the Rion, well know.

Letters may in turn give something back to geography. How can the climate of the Alps have been in Roman times so much worse than it is now, as some would have us think, when the Great St. Bernard, still only just below the snow-level, had a temple on its summit, and was frequently used by Roman armies? when Augustus preferred Rhætian wines, doubtless the modern Veltliner.

And classical names often sum up the *raison d'être* or characteristic of places, thus:—Batoum = Βαθυς λιμην, the deep harbour; Poti, Παλαιον στομα, the old mouth (a fine bit of phonetic decay); Monaco, the lone house; Antibes, Antipolis, therefore later than Nice, the town of victory.

I have, I hope, sufficiently shown that it is both practicable and profitable to teach Britons geography, and consequently justified in your eyes the position the Royal Geographical Society have taken up in this matter. We have, while expressing our opinions fully, left as long as it seemed expedient the cause of geographical education in the hands of the educational bodies. The result has been unsatisfactory. We find they will not act on advice alone; we cannot act without them; we therefore offer them co-operation. I shall now try to develop briefly, as far as it is formed, our scheme, or proposal, adding a few remarks suggested by the Society's Exhibition of Geographical Appliances now open in this town (Birmingham).

We are assured on all sides, and are confident ourselves, that the key of the problem is contained in these two words, *Teach teachers*. The evidence on this point, collected by Mr. Keltie, is conclusive.

A public schoolmaster says:—

"One of the difficulties in dealing with this subject is the great scarcity of specially qualified masters. This subject not being required for the usual degrees at the universities, few of the young masters at public schools know very much about it. Another is the somewhat absurd prejudice against teaching geography, as if it were less worthy of a first-class man than Latin prose or essay writing or criticism. This prejudice is dying away, but it is still felt as a sort of back current, and I have known able men fresh from Oxford or Cambridge who fretted at having this subject entrusted to them. It is connected, no doubt, with the old-fashioned mechanical conception of geography, now, I trust, vanishing into the limbo of exploded fallacies."

Again, Prof. Boyd Dawkins writes:—

"The deplorable ignorance of geography among all classes in this country is largely due to the bad teaching in the elementary and

secondary schools. We are feeling our way (in Owens College) towards a more systematic teaching."

In 1883 Prof. Judd and Mr. Norman Lockyer write of the "Science and Art" Examinations in Physiography at South Kensington, "probably a number of inexperienced teachers have taken up the subject for the first time, and the low standard of their results has had a marked effect in bringing down the average of the whole examination."

It is obviously idle to expect pupils to take interest in a subject their teachers dislike and disparage. We do not, of course, assert a universal negative, that there are no good teachers of physical geography at present. Happily there are a "good few." There are more, doubtless, who would be glad to qualify themselves,—

> "Those not blind who wait for day,
> Tho' sitting yet with doubtful light."

But the supply is not equal to the demand. And then it must be remembered that at many schools—take my own, Eton, where physical geography is beginning to be looked after—historical geography is left to the classical masters, who do not teach it because it has formed no part of their own training.

Our first inquiry therefore must be, How can the teachers best be got at? As to the upper and lower classes, experience answers promptly, Through the universities and training colleges. These produce assistant masters and pupil teachers.

But as to the middle classes. If Mr. Arnold were here he might tell us that the difficulty was the result of the absence in England of any organised scheme of secondary education. It *is* a difficulty, and one in which further suggestions might be welcome.

In making the universities the first object of our attack we are supported by an enormous mass of independent and weighty opinion. It will be found in Mr. Keltie's Report and its appendices, and I must not multiply quotations.

In the same volume will be found the letter and proposals that have been addressed by the Council to the Universities of Oxford and Cambridge. We believe them to be practical, and we trust that, considering the fact that we are prepared to back our opinions handsomely in cash, the universities may be able, despite the bad times, which affect their rents as well as other people's, to see their way to meet us. We are sure that if they do, it will tend as much to their advantage as to ours.

It is an obvious anomaly that there should be chairs of such comparatively obscure branches of research as some of those instituted in the universities, and none of a science already recognised and examined in. This is a strong point in our case. The Honour Candidates in the Oxford History School have a whole paper of geographical questions.

Practically, the university at present examines in what it does not teach, except by an occasional lecture bestowed in charity by a sympathetic historian.

The chairs of geography at Oxford and Cambridge, which we may hope to see established, will, if proper occupants are found, be more than a source of lectures, more or less well attended, to the passing generation of undergraduates. They will give a centre and status to educational geography. They will, we may hope, lead to the formation of typical educational collections, to the issue of a higher class of educational works. They will do for geography what has been done for art and archæology by able hands at Cambridge, make it a subject of living interest to the best educated Englishmen, and thus avoid the recurrence among teachers of the sentiments adverted to in my last quotation. They will exercise an influence which the Geographical Society, with the best will, cannot exercise, for it is not an educational body, and cannot control the minds of the rising generation or their teachers.

It is a fair objection to the proposal of a geographical lecturer or professor that no man can be found capable of representing the whole subject. I think here again Germany answers the difficulty for us. Prof. von Richthofen writes, "We need not shrink before the fulness and scope of the task. The field is vast. No man is able at this day to pursue his inquiries into all departments of geography. He, however, who devotes himself earnestly to it can appropriate enough to follow its progress in all branches, and while deepening and furthering the section specially under his care, need never lose sight of the connection of the whole. As a matter of fact, every professor lectures according to his own idiosyncrasy, and that during one term the lecturer should incline to the human, and at another to the physical side of geography, will be no disadvantage."

We have also proposed to give an exhibition at the Universities to be spent in travel. I have often been struck by the immense amount of geographical work still to be done in regions within from three days to a week's journey from London. Sir Lambert Playfair's paper on his rambles in Western Algeria, read in this Section, may indicate to you one such region.

For my part, I think one of the most valuable effects of the recognition of geography at the universities will be its reaction on geographical literature. The text-books and readers (I do not speak of the new ones which have appeared—are daily appearing—since our Exhibition was opened last winter in London) have been very far from what they should be.

"We require text-books," says a head master. "Nearly all our present ones are quite useless; they are miniature gazetteers." The main point is that there should be nothing which the boys should not be expected to remember for life. They require to be cleared of lumber,

to be written with more grasp of general principles and sense of proportion. Our books seem often to want not only the critical power best gained for such work by travel, but also the higher culture. Their English is slovenly, and their history is erroneous. We want writers who will tell their pupils nothing which is not worth remembering, and who will also take care to tell them what they do tell in a form that can be remembered, in crisp complete sentences, not by allusions which presuppose the knowledge sought to be conveyed. And now that writers are taking up with new ideas there is perhaps another danger. They must not let themselves be run away with by them. They must make sure their instances are really to the point. Take as an example the relation of land-routes to the position of great towns. "All roads led to Rome," we know. But I cannot see that Rome was made by nature a meeting-place of roads. Rather it was a defensible position on a navigable river, forming a natural rallying-point to the rivals of Etruria. Tiflis does not command the Pass of the Dariel, but the navigation of the Kur. Water carriage became all-important in the centuries between the destruction of the Roman roads and the making of paved highways. The whole string of physical causes which went to make Venice possible and what she was, are a lesson in themselves in physical geography.

The ideal text-book might perhaps be written in conjunction by Mr. Bryce and Mr. Bates. Even then it would gain by being revised as to each country by a resident. I need hardly point out how much our colonists could aid to such a work by working up their own home teaching, and keeping up accurate text-books of their own homes for their own schools.

Another want of our literature is an English Reclus. How many absurdities, sometimes dangerous absurdities politically, would not such a work of reference on our leading newspaper editors' shelves save us! We should not be bewildered over our breakfast-tables by the news that a railway was about to be made through the Engadine to shorten the communication between South Germany and Venice; that Lord Dufferin as Governor-general had gone to look after a volcanic eruption in the Dutch Indies; or that Batoum was the key to the Persian Gulf; or that Abkhasia was the Land of Schamyl.

As to the teachers in primary schools, it may be possible to do something by organising in conjunction with the Education Department a series of prizes for proficiency in geography. Lectures adapted for their requirements will be given in London and elsewhere by the readers we hope to see appointed. These will give them that sound elementary knowledge which need by no means be superficial. But more, perhaps, will be done indirectly by encouraging by criticism and advice the production of thorough works on geography. For if the teacher is well read, the child will be well taught. The school text-book, however important, is still of secondary importance. They would further be

helped by promoting the construction or introduction (whichever our publishers please) of the best wall-maps. In conjunction with these, very cheap little hand duplicates might, as at Zürich, be used by the class. Then by the aid of photography we may hope to get quantities of cheap and graphic illustrations of physical phenomena, to the use of which I attach very great importance. Already I learn that one of the series used in Germany is to be reproduced in England in a cheap reduced form. In my days we had only the simoom and the maelstrom. We must pray also that the cuts in text-books may no longer be like that terrible libel on mountains and a glacier in Prof. Huxley's 'Physiography,' in which the hill-side is built up of flat cheeses, and the glacier drops its moraine like a road surveyor his stones in equidistant heaps, or the still more preposterous representation of "roches moutonnées," which is served up again and again to unfortunate pupils. A photograph of the stone near the first bridge in Borrowdale would be worth hundreds of such libels on nature. It is quite preposterous now that we have such admirable photographs of all sorts of regions remote laterally or vertically, that we should use inaccurate designs for teaching. One photograph of Mr. Donkin's will illustrate half the phenomena of glaciers; one good view of an African village will throw light on a continent. In this matter America sets us an example. See the admirable views of the Colorado gorges, and lately of the peaks and glaciers of the United States, issued by the Survey Department, or the photographs of Niagara now in the Birmingham Exhibition. One American idea, however, I hope we shall not adopt. Their system of setting one subject inside another is sometimes pretty. But for teaching purposes separate subjects should be kept separate. In this matter of illustrations our colonists again can help us by organising selections of typical representations of their own regions.

There are other things suggested by the Exhibition to which attention may well be paid. I should like to see an attempt made to reproduce, on the flat, physical wall-maps imitating from a distance as far as possible the effect of relief maps. Relief maps are excellent things, but they must always be expensive, and somewhat cumbersome.

I think something may be done in the way of organising a system for the colouring of contour lines of elevation. In maps on a similar scale the same system might be generally used. They would, among other things, be found of use as material by professional map-makers who have to prepare maps for special purposes.

The Ordnance maps (I could wish we had any on a moderate scale to compare in clearness and graphic delineation with the Siegfriedkarte of Switzerland and the Carte Vicinale of France. The indiscriminating way in which by-roads, cart-tracks, and bridle-paths are laid down, and the very poor keeping up to date as to novelties, particularly new railways, are two serious defects, due probably more to Treasury stinginess

than to any lack of zeal in the Staff in our maps)—the Ordnance maps, I was saying, are of course available in that *Heimatskunde*, or local topography, on the claims of which it is at present the fashion to lay, perhaps, exaggerated stress. Useful it is, no doubt, but it is, I venture to suggest, most useful as a means of illustration of wider teaching, with which it should be constantly kept connected. I do not think it has ever been proposed, even in a Church school, to teach the infants the whole duty of the vicar and churchwardens before they are informed as to the estates of the realm. The imagination of youth is the teacher's best hold on it. "It is the general truths," said Mr. John Morley, lecturing here ten years ago, "that stir a life-like curiosity as to the particulars which they are the means of lighting up." And what is true of history is equally true of geography. If the German-Swiss go into their home-study so thoroughly, we must not forget that they also take their children on extended tours. These scholastic tours or "caravanes scolaires"—a great feature in France also—are as yet hardly known among ourselves. When Mr. Cook has done with the pilgrims to Jerusalem, Mecca, and Fusiyama he will, perhaps, think of the children. At present, judging from what I have seen during the last month or two on one of our southern lines, the holidays of London children must lead them to believe that the world is a flat plain, broken only by the Swing Range, and the Giddy-go-Round Heights, and bounded on all hands by railway embankments! In England it is only in a prince's education that touring as yet takes any prominent part. I do not mean to suggest that the rate-payers should provide gratuitous tours for the poorer classes as they already do in France. But there are, or there ought to be, middle-class schools where such field-teaching would be possible. Parents are as well-off in England as in France, and not less liberal. And for pupil teachers and advanced students it is obvious that something in this direction might be organised with advantage.

By some such means as these we may hope to persuade the teaching public that the world we live in is as proper an object of study as the parts of speech, and even more stimulating to the youthful imagination and intellect.

Minor suggestions made by the Council are that we should endeavour to give life to the study by encouraging travellers or geographers of reputation to give illustrated lectures in out-of-school courses such as exist at Eton and Rugby. The Council has subventionised to the extent asked the geographical lectures in the University Extension courses. It already gives prizes through the examiners in the Local examinations at Cambridge, and to the lads on the training ships at Deptford.

If you want more details and the very words of the Council proposals you will find them in the published volume containing Mr. Keltie's admirable Report and Mr. Bryce, Mr. Ravenstein, Professor Moseley, and Mr. Keltie's lectures.

The results we look to, and the importance of which justifies in our eyes these measures, I have already touched on. In the first place school will be made a brighter place to children; school-learning and out-of-door things will be brought into more direct connection in their small minds. When they grow up these children will be better prepared if called on by circumstances to go forth as colonists, better able to profit by their opportunities in a new country; they will not be haunted by that dread of the unknown, of as it were going to another world before their time, which so powerfully affects—I speak from East End experience—many working men. They will be better clerks and merchants, for they will understand better the local conditions which must largely influence their success; they will—the recent French war has demonstrated this—be more effective soldiers. In literature, without losing, let us hope, the healthy English spontaneousness, without becoming pedantic, we shall produce better books of travel, more works like Stanley's 'Palestine.' We shall create a supply as well as a demand. It will no longer be the case that no publisher will in England find subscribers to support for a length of time a scientific geographical magazine like Petermann's or a popular illustrated magazine like the 'Tour du Monde.'

In politics we shall have perhaps fewer of those difficulties which come of first making a treaty in ignorance of physical facts, and then trying to revise it in the face of an astute opponent whom we have ourselves put technically in the right. We shall surely be better able to see things in their true proportions; we shall understand that all the serpentine and subterranean dealings of Russian politicians, their tergiversations and kidnappings, are at root the outcome of the natural and inevitable tendency of a great Power to get to the open sea somewhere, and that we must consider seriously whether we shall be best advised to endeavour to stop her altogether, or to consider where she may find exit with the least injury to growing nationalities and ourselves.

We shall be less likely, in a flurry over troubles at home, to neglect our interests overseas. We shall not, while we are discussing whether or not Ireland shall be allowed to throw up its share of imperial power for the sake of "helping herself" at home, allow the empire of which it forms a small, and will in a hundred years form only an infinitesimal part, to fall to pieces.

I have not pleaded with you in favour of geography in education as one who doubts of ultimate success. We have in our favour, I will not say the flowing tide, for tides ebb sometimes sooner than it is expected, and the simile is a trifle discredited just now. We are rather, I would say, riding on the stream both of expert opinion and public sentiment. Or to change the metaphor, the germs of our scheme are in the air, and what is in the air you must swallow sooner or later. The nation having the greatest opportunities in and from geography will not consent perma-

nently to remain under the reproach of being the least prepared to use them; the proprietor, with the finest estate in the world, is not such a fool as to continue to know less than his neighbours about its capabilities. We shall succeed in our object—a little sooner or a little later, as you and others may please.

With regard to the representation of physical features, and particularly mountains and tablelands, I confess I am somewhat of a conservative. I do not mean that I would go back to the old system of representing big mountains by sugar-loaves and small ones by plum-puddings, a delightful example of which I possess in a work on the Abruzzi of the last century. I am not any more satisfied with the caterpillar arrangement, which reaches its height of absurdity in the misrepresentation of such a country as Palestine. But I cannot bring myself entirely to accept the exclusive use of colour and contour lines, very well exemplified in the capital and most practically useful maps taken from the new Ordnance Survey in Baddeley's Guides. And I utterly abhor the last novelty, which appears to be to exchange the caterpillar for a black eel, with eyes for peaks, and to make lakes look like mountains by a fringe of hatches round their margins.

The most perfect representations of inequalities are doubtless obtained by a combination of contour lines and hill-shading, a very fine sample of which will be found in the map of the basin of the Aletsch Glacier annexed to Prof. Heim's important work on 'Gletscherkunde.' But this system is expensive, and only suited for maps on a large scale, and where first-rate material exists. It is not desirable to hold out any inducement to precision in guesswork; it is so hard to banish an error that has once been accepted. For maps of moderate scale and comparatively little-known districts, hill-shading, such as is used in the best German maps, given by washes rather than lines, seems the most satisfactory.

One word of practical advice I have long wished to give map-makers. When you get a MS. map with glaciers on it to copy, don't imagine that ice must needs lie on a mountain-top, and consequently turn the ice-streams into ridges and cut off connection between them and the rivers. This is unsound physical geography with a vengeance. There seems, also, all over the world, for this criticism applies abroad also, a most serious need of some system, perhaps some yearly publication, which should warn cartographers against recopying exploded blunders, and inform them of new discoveries.

It is the old blunders that most need looking after. Here in Randegger's great wall-map of the Alps, for instance, is Mont Iseran figuring as tall as ever, though his head was cut off by the late Mr. Cowell a quarter of a century ago. The highest peak of the Maritime Alps is still put down as the non-existent Cima della Mercantoura; and how few authorities have discovered that Monte Rotondo is not the

highest peak in Corsica! that the Apennines do not reach 10,000 feet in the Gran Sasso. And here we have the new volume of the Encyclopædia Britannica raising doubt as to so well settled a question as the highest peak of the Pyrenees. I take orographical instances that happen to be familiar to me, from countries near at hand. I do not wish, however, to be particular in my criticism, or to say anything to damage the improving but still improvable works which are now coming frequently on the market, and some of which are of considerable merit.

Indeed I am rather disposed, looking back, to imitate Mr. Keltie in deprecating the use of the comparison which has necessarily been instituted between the merits and price of English and foreign publications as a means of personal attack on English publishers. Of any blame that exists we, the public, must bear a large share. If the British schoolmaster demands a Joseph's coat—"fully coloured in red, yellow, blue, and green"—I quote a recent Reader—the tradesman must supply it. If the teacher is thoroughly careless of physical geography and does not understand maps that show physical features, how can they be made profitable? You cannot sell Bibles and compasses in New Guinea; they prefer missionaries and spits. Again, cheap prices depend on large sales.

What the British publisher wants is evidence of demand. If we can give it him in the shape of a few more facts of the character of this one, that a Viennese firm are sold out of one of their wall-maps in consequence of our Exhibition, we may expect to see him advance. We shall then have a right to criticise him if he does not come halfway and make supply meet and enlarge demand.

The following discussion ensued on the reading of the above paper:—

The Rev. A. R. Vardy (Head Master of King Edward's School, Birmingham) said that if the admirable paper to which they had listened did not lead to a reform in the teaching of geography in our schools, it would not be because teachers did not recognise the importance and interest of the subject. The fact was that in the higher schools of the country—and it was for those chiefly that he could venture to speak—the teachers were not quite their own masters. They had to prepare their pupils for the Universities; those pupils must go up to the Universities ready to pass examinations in certain subjects; and unfortunately in those examinations geography held a very humble place. To classics and mathematics a high value was attached at Oxford and Cambridge; history, modern languages, and some branches of natural science had less value there, but yet an appreciable value; geography was of little account, except so far as it was needed to illustrate Latin and Greek authors. School life was short; the conflict of studies was severe; and this particular study was thrust out by others. The Geographical Society had, by their generous prizes, done their best to encourage it, but the result had been disappointing; the competition had not attracted the best talent of the schools; and he doubted whether the gold medal had often fallen to pupils who were afterwards distinguished at the Universities. On this point the late head master of Dulwich, a school which had carried off an unusual proportion of medals, would be able to speak with authority. The conclusion to which he was himself led was that it must be by pressure brought

to bear on the Universities that they might hope to see a stimulus given to the subject. He had seldom been able to interest his elder boys in anything like a careful study of geography for its own sake; it had only been when it indirectly bore on classical work that he had found them ready to take an interest in it. He was, however, fully in accord with the suggestion made in Mr. Freshfield's paper that in high schools a more systematic attempt should be made to treat geography as a connecting link between natural science and history, and between natural science and literature. It was the experience of every teacher that even a few maps and photographs gave a new zest, a greater reality, to the study both of literature and of history, and the interesting exhibition of appliances for geographical teaching arranged in the rooms below would show how much more might be done in this direction. He might venture to add a single practical suggestion. It was impossible to cover the whole field, or any great part of the field, of geographical knowledge, and that teacher would not be the least successful who limited his teaching to such corners of the subject as he really knew well. A few lessons about a country or a part of a country which the teacher had visited, where he had climbed the hills, explored the valleys, and sojourned in the towns, would be worth many lessons based on a mere book-knowledge.

The Rev. GEORGE BROWN (late missionary in New Ireland) urged the importance of geography in relation to our Australasian colonies and the political questions of the day in which the islands of the Western Pacific are concerned.

The Rev. HEREFORD B. GEORGE (New College, Oxford) said that his experience as to geographical education was of two kinds:—as having attempted to teach geography for the Modern History School at Oxford, and as having had large experience in school examining, especially in connection with the Oxford Local Examinations. As to Oxford, he was afraid that though geography was formally included among the subjects of the Modern History School, and was not unrecognised in other schools, yet practically, knowledge of geography counted for but very little in the examinations; and inasmuch as undergraduates had to prepare their work in a limited time, they naturally laid most stress on what would "pay" the best. As to the schools, though there were some in which it was evident that geography was well and intelligently taught, in the majority the knowledge gained was vague and unreal, crammed out of manuals, often antiquated, and with little basis in study of maps. For instance, in the recent Local Examinations (of boys and girls, chiefly from second grade schools all over England, averaging about seventeen), several candidates had described two adjacent countries as being each east of the other. He was afraid, however, that it was not the school children only who were ignorant or careless of geography; there was no mistake half so common in print as putting east for west, or west for east. Probably that error might be found, for instance, once or twice at least in the daily newspapers of every day in the year. The only remedy, in his opinion was to teach the teachers, and to this end, so far as higher education went, the place to begin was at the Universities. He had little or no knowledge of elementary schools, but so far as he could judge the proposals of the Royal Geographical Society were excellent as regards these also, and he hoped that the British Association would give to the Society's scheme all possible support.

Canon TRISTRAM could not claim much experience in the teaching of geography for the last few years, but he had had the honour of examining for the Royal Geographical Society's Medals, and also was, and had for some years been, Examiner for Lady Strangford's Geographical Prizes at Harrow. He was afraid that the influence of such special prizes did not extend sufficiently throughout the whole school, but was rather confined to a few boys, who might be looked on as geographical specialists. The examination was divided into general and special papers, and for the latter, books on the country selected as the special subject were recom-

mended a year in advance. The special subject was generally well got up by all the competitors. But with the exception of those whom he had termed geographical specialists, few boys showed any grasp of geography, even when it might most reasonably be looked for, as in classical countries, or in those which were the theatre of present military or political events. Of course the cultivation of a special genius in the line of its development was most important, but it was by no means necessary to neglect the training of the ruck of boys while doing this. He had noticed that Dulwich College always stood pre-eminent in geography, both as regarded the special few and the average many. Whether genius was always turned to the best account was another matter. He remembered assigning the Geographical Society's Gold Medal to a Dulwich boy, whose answers showed a natural grasp of geography, both physical and political, which would have qualified him as an Afghan Frontier Commissioner, and he must confess he was a little disappointed to find that the youth was now at his desk in a London solicitor's office. They might be sure that the same method of teaching which brought out the special talent of the few would also at the same time raise the geographical knowledge of the many. He thought that it would be a mistake in school teaching to make geography a special subject, it was rather a subtle essence which should permeate the teaching of all subjects, whether classical, historical, or physical. It was admitted that the historian must be a geographer; it was almost more necessary for the naturalist, and the taste for natural history and geography was always combined in boys. Let them take, e. g. the question of geographical distribution of species—how suggestive was this of physical geographical questions in all their ramifications. Why is such a fish found in such seas? Why is such a plant or bird found on such an island? And so with the teaching of history. He remembered once walking with a Winchester boy over the field of Waterloo. The boy had never been there before. After standing on the mound and looking round, he said, "Let us go there," pointing to a little rising ground. On reaching it the boy said, "Here it was that my grandfather's regiment stood in square." He asked him how he knew. "Oh," he replied, "we did the history of the war with France last term." Thus the descriptive power of an able teacher of history had so imprinted the topography on the boy's mind that he at once knew where he was. In short, rather than have geography lessons so-called in our schools, he would have all teaching, whether classical or historical, or of physical science, saturated with geography.

The Rev. E. F. M. McCarthy (Head Master of King Edward's Grammar School, Five Ways, Birmingham, and Vice-chairman of the Birmingham School Board) said that he would like to endorse the expressions of appreciation of Mr. Freshfield's paper from the point of view of his own experience in connection with elementary education. He was sure that teachers were largely conscious of the need of a wider and sounder grasp of the subject of geography. It must be conceded that though the teaching of geography might not be rendered impossible through its many-sidedness, it was made very difficult thereby, and the misfortune was that the teacher was not his own master in the matter, but rather was very much a slave—the slave of a government code. If the curriculum of the code was one-sided (and it certainly was very badly so) he must be one-sided too, however many other sides there might be of which he had knowledge and to which he attached importance. As a further apology for his one-sidedness, it must be borne in mind that the code regulated his training, as well as his teaching. What was needed—on behalf of geography, as well as of almost every other subject of instruction in elementary schools—was a complete remodelling of the code curriculum and regulations so as to adapt them to the better conception of the aims of education for the working classes which had taken shape in the last few years. He would urge the formation of a conference of

experts to decide on the range of geographical teaching for such schools, and to press its adoption upon the Education Department. An attempt to reach the department through such a conference was made in 1881 under the encouragement which Mr. Mundella gave to outside criticisms on the code curriculum. This conference on code reform was composed of such representatives of science as Professor Carey Foster, F.R.S., Dr. Gladstone, F.R.S., Professor Henrici, F.R.S., and Professor Max Müller; of the teaching profession, authorities such as the Head-masters of Bristol Grammar School, University College School, and the "Middle" Schools of Birmingham and the City of London; and of managers of schools, Members of the School Management Committees of the School Boards for London, Birmingham, Leeds, Sheffield, Bristol, Nottingham, and Leicester. The measure of success in influencing the Education Department was not great—was to a large extent disappointing. But there was nothing to dishearten the workers in such a cause, and he felt convinced that a fuller measure of success would attend a further effort; and with regard to geography, he would ask whether this Committee of the British Association could not combine with the Geographical Society and place in the hands of a Select Committee the task of inquiring into the present teaching of the subject and the hindrances to it, with a view to publishing their criticisms and suggestions, and pressing them upon the attention of the department.

He would like to say one word on the subject of text-books alluded to by Mr. Freshfield. Mr. Freshfield thought that the ideal text-book might be written by Mr. Bryce and Mr. Bates in conjunction. He had nothing to say against such a partnership; on the contrary, he was ready to acknowledge that no two men could be found better fitted to work upon the ideal text-book, but he hoped to be pardoned if he said that the text-book produced would not be the ideal one unless a third partner were added, and he were a schoolmaster.

The Rev. Dr. Carver (who presided over Dulwich College for twenty-five years) said that he had shared the interest with which all present had listened to the thoughtful and suggestive paper of Mr. Freshfield. Though it had not been his intention to take part in this discussion, yet after the allusion made by Canon Tristram to the competition for the Medals of the Royal Geographical Society and the direct appeal addressed to him by Mr. Vardy, he felt that he could not in courtesy refrain from stating to the meeting the conclusions to which his own experience at Dulwich had led him. As a subject of instruction in our public schools, geography, like every other branch of learning, must be considered from two distinct points of view—with regard, on the one hand, to the intrinsic importance of its results, and on the other to its value as a means of intellectual training. On the former point they had had the advantage of hearing the admirable remarks of the President of the Section in his opening address. The few observations which he should make would have reference rather to the latter. Geography supplied perhaps better than any other subject a point of contact in which all the main lines of school teaching—the classical (in the widest sense of the term), the mathematical and the scientific—met, or from which (to put it in another way) they might all advantageously diverge when the age at which it was thought necessary to specialise school studies was reached. There was no doubt much force in what had been said about the difficulty of finding well-qualified teachers. Perhaps he had himself been exceptionally fortunate; but he ventured to think that if once there were a recognised demand, it would not be long before there would be an adequate supply to meet it. In the competition for the Public School Medals of the Royal Geographical Society in the ten years from 1875 to 1884, Dulwich boys had won 15 medals, of which 11 were first or gold medals, either for physical or political geography. This result was no doubt mainly due to the fact that he had secured the services at Dulwich of

a most able teacher (Mr. Robinson), who combined with high mathematical attainments an enthusiasm for the study of geography, which he succeeded, like all enthusiasts in a good cause, in imparting to a great extent to his pupils. But a doubt had been expressed whether the introduction of geography into the curriculum of our public schools would not interfere with the preparation for the Universities. He had no such fear. The subject had been taken up at Dulwich by boys of widely different tastes and talents, as well by boys studying for the various professions as by those preparing for business pursuits, and taken up, as he thought, with advantage by all. More than one of the gold medallists had proceeded to the University, and had won open scholarships at Oxford or Cambridge. He was not at all disposed to complain that the question was asked, Will this subject "pay"? The question put thus crudely might indeed seem to imply a low and unworthy view of the objects of education; but after all it was a practical inquiry, which they could not ignore or evade. Parents would ask it if the boys did not. The study of geography, he was convinced, need not shrink even from this test. It would be inferred from what he had said that he was not by any means prepared to take the pessimist view of the future of geographical teaching in our public schools which had been expressed by some of the speakers. The Royal Geographical Society had, he believed, already accomplished much. There was, however, one serious defect in their scheme, to which their disappointment in the apparent results was, in his opinion, in a great measure due. They had liberally offered prizes—a gold and a silver medal to those who attained the highest proficiency in each of the two branches of the subject; but unfortunately they had not seen their way to issue a class or honour list in geography. Had they done so, they would have attracted a far larger number of candidates—perhaps an embarrassing number—to their examinations; and the winner of a "first class" or a "second class" in one year would have looked forward to being the medallist of the next year. Boys were quick and shrewd enough in measuring themselves against their competitors, and while they would be stimulated by the hope of a "class," they would decline to enter a competition for a prize which they knew that they had no chance of winning, and thus to stamp efforts which might be really meritorious and fruitful with the stigma of failure. The Society had, however, given an impulse to the study of geography, the force of which would not soon be expended. But while much had been done, much no doubt still remained to be done. All to whom he was speaking would, he felt sure, deeply regret if the Society, to which they owed so much in the past, should abandon their efforts in this most useful department of its work, the promotion of the sound and efficient teaching of this important subject.

Professor Macoun (Canada), Mr. F. Young, Mr. Trelawny Saunders, and Mr. Ravenstein also took part in the discussion.

GEOGRAPHICAL NOTES.

Proposed Renewal of Antarctic Exploration.—The movement set on foot by Admiral Sir Erasmus Ommanney at the Aberdeen Meeting of the British Association in 1885 found prompt participation in various quarters. In July last the Royal Society of Edinburgh appointed an influential committee to consider the question, and a report of the committee, which pithily sets forth the scientific objects to be gained by an Antarctic expedition, was adopted by the Council, and ordered to be printed and circulated. The Scottish Geographical Society also gave in their

adhesion. The subject has since been discussed in Australia by a special committee of the Royal Society of Victoria, who have issued a report, signed by Captain Crawford Pasco, R.N., A. C. Macdonald, and A. K. Rusden, in which they declare the willingness of the Australasian colonies to render assistance to an Imperial expedition if decided on, and the intention of the committee, meantime, to arrange for the despatch to the Antarctic regions next season (December to March) of a steam whaler, with a small staff of observers, for the purpose of discovering some safe winter harbour for the projected expedition. At the recent meeting of the British Association at Birmingham, the committee was strengthened with fresh names, and renewed for another year.

German New Guinea.—According to a recent note in Petermann's 'Mitteilungen,' Dr. Schrader's expedition * arrived in Finsch Harbour, New Guinea, on the 19th April. No important explorations had at present been undertaken, as the Malays could not be spared for any length of time from the station, and the Chinese who were brought from Cooktown had proved totally unfit for the work. But two short excursions had been made from Finsch Harbour, one under the leadership of Dr. Schrader to the Coral river, about nine miles inland, and another under Dr. Hollrung to Langemak Inlet; the latter included a short journey on the river Bubui, but the rapids prevented much progress being made. According to the latest news, Admiral von Schleinitz had arrived at Finsch Harbour on the 10th June. The discovery, by Dr. Finsch, of the important river, named the Empress Augusta, on the north coast, has been confirmed by Captain Dallmann, who on the 4th and 5th April followed the river in a small steamer for a distance of 40 miles. The river appeared to be navigable for a much longer distance. The New Guinea Company has erected a second station at Hatzfeldt Harbour (145° 9′ E. long. and 4° 24′ S. lat.), and a third at Constantine Harbour (145° 45′ E. long. and 5° 30′ S. lat.).

The Geographical Society of Australasia.—We have received the first volume of the 'Proceedings' of the South Australian Branch of the Geographical Society of Australasia. It is mainly occupied by the inaugural address of the President, Sir Samuel Davenport, on the progress of Australian exploration.

New Survey of the Nicobar Islands.—The Indian Government have decided to survey the Nicobar Islands during the present field season. The most important of the Nicobar Islands are Car Nicobar, Camorta, and Great Nicobar. The latter and Katchall, being the most incorrectly shown on the charts, will be surveyed first. Some interesting papers on the Nicobar Islands will be found in a volume of selections from the records of the Government of India, Home Department, No. lxxvii., published at Calcutta, 1870. Existing maps of the islands appear to be

* 'Proceedings R. G. S.,' *ante*, p. 269.

based on Captain Alex. Kyd's survey of 1780, supplemented by charts by Captain Robert Lindsay, John Ritchie, and others.

New Capital of Formosa.—In the process of reorganising Formosa as a separate province, the Chinese Government propose to introduce certain administrative changes. A new city will be built at a place called Hu-lu Tun, now a pretty village almost half-way between Chia-yi and Chang-hua. When completed, it will form the residence of the Governor and Provincial Treasurer, and will be the capital city of the province. Pending completion, the seat of the Government will be at T'ai-pei Fu (Bangka). As the prefectural city of T'aiwan will no longer have the same pre-eminence its name will be changed to T'ai-nan.

Topography of Southern India.—A rather important change has been determined on in India in regard to the topographical work which still requires to be carried out in the Madras Presidency. Hitherto, the topographical surveying was carried on by the Revenue Surveyors, who acted under the Board of Revenue at Madras. The surveys were connected with the fixed points of the Trigonometrical Survey of India, but little else was done to make them useful from a geographical point of view, the revenue authorities being naturally more solicitous about the revenue assessments than anything else. The topographical maps turned out by the surveyors were not in accordance with the principles in practice at the Survey of India Department, and the results were not generally available for incorporation into the Atlas of India, or for the construction of general maps. The Government have now decided to transfer the topographical work from the Madras Survey Department to the Survey of India Department. This will ensure that the remainder of the topography in Madras will be carried out in the style and in conformity with the principles which are officially recognised as the best. The Surveyor-General will therefore proceed to survey the uncompleted portions of the following districts on the one-inch scale, viz. Ganjam, Vizagapatam, Tinnevelly, Madura, South Canara and Malabar, comprising an aggregate area of about 12,400 square miles. The survey of the forests in the four last districts will also be undertaken by the Survey of India, on the scale of four inches to the mile. The Mysore party, which has just accomplished the survey of the province, will be transferred to undertake the above operation in Madras, and will probably commence work during the ensuing field season.

Dr. Radde's Journey to Sarakhs.—We learn from Petermann's 'Mitteilungen' (No. 10) that Dr. Radde arrived at Sarakhs on the 10th (22nd) July, after a successful excursion to Merv and the Afghan boundary. He ascended the left bank of the Murghab to Penjdeh (Pandj); the right bank is high and formed of old, clayey rather than sandy, dunes; Baer's law as to the flow of rivers finds, according to Dr. Radde, an apt illustration here. The so-called woods along the Tejend and

Murghab consist only of solitary poplars (*Pop. diversifolia*) and exceedingly thick underwood composed of tamarisk. Dr. Radde and his companions suffered severely from the heat in the Murghab valley. After a short stay at Takhta-Bazar, whence Dr. Radde's companion Konshine undertook short trips to the caves* on the Murghab and to Meruchak, they went along the new boundary which leads through the dreariest solitudes by the bitter wells of Akrobat to Sulfagar (Zulfikar) and along the Tejend to Sarakhs and Askabad. The month of July was devoted to the exploration of the Kopet-tagh, five parallel chains of which were crossed, and on the 28th August (9th September) last the expedition returned to Tiflis.

The Expedition of MM. Capus and Bonvalot to Central Asia.—This expedition, which was undertaken to complete the explorations made in Central Asia by Dr. Capus in 1880–2, left Paris in March last and proceeded to Batum, whence the travellers journeyed by the Russian post to Lenkoran, a port on the Caspian. They then started for Teheran on horseback, following the route along the shores of the Caspian: the path lies along the actual sea-shore, but diverges at times into the forest. The forests of Ghilan are almost virgin; the trees interlaced with vines, brambles, climbing ranunculaceæ, and stout ivy, are covered with mosses and lichens. This luxuriant vegetation is due to the humidity of the climate, the aqueous vapour with which the north, north-east, and east winds are charged from the Caspian, being intercepted by the Bogrob range. The Caspian slopes of the range are clothed with dense forests, while on the other side the plateaus of Ardabil and Chalkal are covered with steppe vegetation; from the latter a hot wind blows down at times on to the district of Ghilan, parching the vegetation like the "Föhn" in Switzerland. Passing through the well-watered district of Talysh, the expedition reached Teheran on 11th April, and proceeded thence viâ Meshed, Sarakhs, and Merv, to Samarkand. From Sarakhs to Merv, four days' journey, they took the more westerly route, as being the easier and shorter. The Tejend here flows in a broad bed between densely wooded banks, and forms in places small swamps, the exhalations of which render the region unhealthy. In the summer months there is no water for a distance of over 80 miles. At Dastabad the travellers unexpectedly obtained drinking water in abundance from a series of lakes formed by an overflow of the Murghab in the month of May. A stay of one month was made in Merv and the vicinity. The expedition left Merv on 22nd July for Chardjui. There is no drinkable water between Yussuf-shan (13 miles from Merv) and the Repetek well, nearly 90 miles distant. The journey to Chardjui is difficult at this time (July) of the year. The animals

* A full account of these caves, with plans, is given in our 'Proceedings,' N.S., vol. vii. pp. 583–591.

can only travel at night, the thermometer during the day rising to 81° (Fahr.) n the shade. After leaving Kiltchi the moving sandhills, called "Barchaus," become more frequent and render travelling arduous in the extreme. They are proving a great obstacle to the construction of the Trans-caspian Railway. On the way from Chardjui to Samarkand, the travellers touched at Karakul and Kermineh, visited by them in 1881. Their intention was to leave Samarkand in a few days and march through Hissar to the Amu-Daria with the view of finding a route to Balkh. They would then make an attempt to reach Kafiristan over the Hindu Kush, hoping to find a pass still free from snow.

The Portuguese Expedition into Central Africa from Mozambique.*—Major Serpa Pinto and Lieut. Cardozo, the leaders of this important expedition, arrived in Lisbon on the 13th of July. According to our last announcement, the party, then under Lieut. Cardozo, was at Blantyre and greatly in need of supplies early in the present year. Instead of proceeding to Tete on the Zambeze, as was then anticipated, Lieut. Cardozo took the direct land route to the coast viâ Mount Milanji, and reached Quilimane in May last. The work accomplished by the expedition, in spite of the drawbacks caused by the ill-health of its leaders, are stated by Senhor Cordeiro, the able secretary of the Lisbon Geographical Society, to be of considerable scientific value. It was provided with excellent instruments, and succeeded in taking numerous astronomical and other observations, and in triangulating a large part of the country traversed.

The Gold Coast.—Upper Guinea, more especially the river Volta, has recently been the scene of considerable activity on the part of German explorers. Foremost among them we may mention Dr. G. A. Krause, who has made a journey down the river, from Salaga to the coast, a distance of about 200 miles, returning again up the river to his starting point. He has, moreover, prosecuted several explorations into the unknown territory east of Salaga. The same region has also been traversed by the Basle missionaries and Captain Lonsdale. The town of Salaga is of great commercial importance, as it commands an extensive trade with the interior of the Soudan, and is the commercial centre for the products of the whole Niger territory.

Lake Zuway.—Signor Traversi, who is at present in Shoa, forwards some interesting information on this lake, which he received from a trustworthy native. The lake is said to receive a large affluent, which rises in the mountains to the east of the Soddo and Lauraghi, passes to the north of the lake, and enters at its eastern extremity. This river is called Maki, and its volume is said to be larger than that of the Hawash. The people who live near its mouth prefer its water to that of the lake,

* 'Proceedings R. G. S.,' 1884, p. 744; 1885, pp. 44, 119, 337; 1886, p. 329.

as the latter is said to be bad. There are five islands in the lake, of which three are inhabited. The king lives on the largest. He has numerous canoes, which enable him to make raids upon the cattle of the Arusi Galla, who occasionally visit the lake. The five islands are shown and named on the Society's map of Eastern Equatorial Africa, and a river Machi is shown there to drain the lake into the Hawash. This river is first shown on the map of Baltarar Telles, published in 1645.

Western Sahara.—The Spanish expedition to the western part of the Sahara, under the leadership of M. Cervera, M. Fr. Quiroya, Professor of Natural History at the Museum of Madrid, and Consul-General F. Rizzio, has returned to Madrid. Starting from a station on the river Oro near the coast, they penetrated the little-known part of the desert for a distance of 270 miles, and reached Adrar. The journey was attended with great hardships, consequent on the want of water and provisions, but will prove valuable to science, the travellers having brought back extensive geological and natural history collections, besides having made a large number of astronomical and meteorological observations. They returned to the coast on 24th July, after an absence of six weeks.

The Sierra Nevada de Santa Marta.—Dr. Sievers, the geological traveller who has for some time been exploring the mountainous regions of Venezuela * and Colombia, has recently communicated to the Geographical Society of Berlin the results of his examination of the Sierra Nevada of Santa Marta, entering especially into its geological formation. He maintains, contrary to the opinion of previous explorers, that the mountain is not isolated, but really forms part of the Andes chain. The expense of Dr. Sievers' journey is defrayed by the Karl Ritter endowment.

Isthmus of Darien.—Dr. Polakowsky contributes to Petermann's 'Mitteilungen' (No. 9) a short paper embodying the results of a visit made last year by a missionary sent by Bishop Theil of Costa Rica to the Cunos or Tull Indians of Darien. These results are interesting from an ethnographical point of view, as they supplement, and in many instances correct the information obtained by Lieut. Wyse, during his well-known journey. The villages of Paya and Tapaliza were more especially visited. The modes of life of the natives are not so barbarous as supposed. Polygamy does not flourish to any great extent; the fact that several families often live in one house misled the French travellers. The natives are, however, very ignorant, and especially superstitious regarding their dead, whom they bury in a very peculiar fashion; they have no idea of a resurrection. The women wear little clothing, and have an angular ring through the nose which is painted red. Both men and women wear their hair long and curled. The missionary found them very amenable when kindly treated.

* 'Proceedings,' 1885, p. 612.

The 'Fylla' Expedition to Greenland.—The Danish gunboat *Fylla*, which was despatched to Greenland in May last, under the command of Prince Waldemar of Denmark, has returned to Copenhagen. The vessel reached with comparative ease Upernivik, the northernmost colony on the west coast, being only detained, in the middle of June, for a few weeks at Godthaab by the ice setting in from the sea. During the voyage up and down the coast hydrographical, botanical, and zoological researches were prosecuted by the naturalists, Drs. Holm and Kolderup-Rosenvinge, the results being the gathering of an important collection of natural history objects and scientific observations. Samples of the water were taken and its temperature recorded down to a depth of 1600 fathoms, and dredgings of the bottom effected to a depth of 200 fathoms.

New Fishing Bank off the Loffoden Islands.—During the present summer the Norwegian Admiralty have effected a series of soundings off the islands of Röst and Varö, at the extremity of the Loffoden Islands, which has resulted in the discovery of a bank west of the former island, extending nearly 90 geographical miles into the North Atlantic Ocean. The depth here is 150 fathoms, increasing somewhat suddenly to 300 fathoms. The width of the bank has not yet been measured completely, but it has been found to extend for some considerable distance eastward of the Loffoden Islands. It is expected that this discovery will prove of benefit to the herring fisheries on the west coast. East of these two islands the bottom slopes gradually outwards, as in the Westfjord.

The Highest Ground in Denmark.—It has hitherto been believed that the highest hill in Denmark was the well-known historical "Himmelbjerg," in the interior of Jutland. During the present summer, however, topographical measurements have proved that this is an error, there being two higher, viz. Bavnehöi, near Skanderborg, 550 feet, and Skovhöi, near Iding, 540 feet, whereas the Himmelbjerg is only 517 feet. Professor Erslev, the distinguished Danish geographer, highly eulogises the view from the Bavnehöi.

Geographical Education.—The Society's collection of appliances in use in geographical education has been on exhibition at Bradford during the month of October, at the request and under the superintendence of the Bradford School Board. The Exhibition was opened in one of the rooms of the Technical College on October 8th, when Mr. Keltie was present as the Society's representative, and gave a short address on points suggested by the collection. Other speakers were Dr. George Watt, C.I.E., Superintendent of the Imperial Court at the Colonial Exhibition, who showed, with special reference to India, the important bearings of physical geography on political, social, and industrial development; and Mr. T. G. Roper, H.M. Inspector of Schools, who insisted on the im-

portance of geography in education. A conference of teachers was held on October 15th, when a series of short papers were read and a discussion took place. With a view to increase the public interest taken in geography, arrangements have been made by the Bradford School Board for a competition, in which prizes are offered for the best production of hand-made relief and plain maps, models, and other appliances for geographical lessons; and prizes will also be given for a sketch of the geography and associated lore of Yorkshire. Some very creditable relief and plane maps of local origin are added to the Exhibition, the best of them being a model of the district around Skipton, by T. B. Sandford, of Christ Church School. We may state that we have received from the United States Educational Bureau a large collection of data bearing on the position of geography in the schools of the States, specially obtained for the Society.

A New Geographical Serial.—Under the title of 'Geographische Abhandlungen' Hölzel of Vienna announces a new serial publication, to be edited by Professor Albrecht Penck of Vienna. It will consist of a series of monographs bearing on the different aspects of scientific geography, and issued at intervals. The monographs will of course be independent, and the publication will in no way interfere with existing geographical journals. Each monograph will either be an original work—not a compilation—or a translation into German of a memoir of importance which has not already appeared in English, French, or Italian. The following memoirs are in preparation:—"The Glaciation of the Salzach Region," by Dr. Eduard Brückner of Hamburg (just issued); "Orometry of the Schwarzwald," by Professor Ludwig Neumann of Freiburg i. Br.; and "The Division of the Eastern Alps," by Dr. August Böhm of Vienna.

Obituary.

Captain Bedford Pim.—Captain Bedford Clapperton Trevelyan Pim, R.N., who died on the 30th of September last, was in his time one of our most zealous and adventurous explorers. He was born at Bideford, Devon, June 12th, 1826, the son of Captain Edward B. Pim, who died whilst in active service on the coast of Africa. He entered the Royal Navy in 1842, and in the years 1845–51 served under Captain H. Kellett in the voyage round the world of H.M.S. *Herald*, in the course of which the vessel took part in the search for Sir John Franklin viâ Behring Straits. On his return, promoted to the rank of lieutenant, he entered with much enthusiasm into the question of the position of the lost ships of the Franklin expedition, and adopting the opinion that they had found their way into a supposed open sea off the northern coast of Asia, he conceived the plan of a search expedition along the shores of Siberia, and proceeded to St. Petersburg to lay his plans before the Czar Nicholas. Permission to undertake the journey was refused; he then returned home, and joined the search expedition sent out under Sir Edward Belcher in 1852. During this expedition, in March 1853, he performed the feat of crossing the ice

from one of the searching vessels, the *Resolute*, on the east, to another vessel, the *Investigator*, Captain R. Maclure, on the west, thus in a manner accomplishing the long-sought-for North-west Passage. Subsequently he saw active service in the Russian war, for which he had a medal, and in 1857 proceeded to China, on the outbreak of hostilities, in command of the gunboat *Banterer*, and was then severely wounded and honourably won his promotion, being made commander in April 1858. He visited the Isthmus of Suez in the winter of 1858–9, and on the 11th of April, 1859, read a paper to our Society, on the Isthmus, with special reference to the proposed Suez Canal. The paper was published *in extenso* in the third volume of the 'Proceedings' of the Society (first series), followed by a report of the lengthy discussion which followed its reading, in which Mr. Robert Stephenson, Mr. G. Rennie, C.E., General Monteith, Mr. Daniel Lange, and others took part. Shortly after this he was appointed to the command of the *Gorgon*, in which, after other services, he was sent to the West Indies and Central America, to counteract the designs of the filibusters, under General Walker, against the Republic of Nicaragua. Whilst thus engaged on the Atlantic seaboard of the Central American States in the years 1859 to 1861 he interested himself in the question of interoceanic transit across Nicaragua, and a few years afterwards promoted surveys for a projected railway between the Nicaragua Lake and the shores of the Gulf of Mexico. On this subject, and on his own discovery of a suitable terminus, "Pim's Bay," 35 miles north of Greytown on the Gulf side, for the proposed railway, he read a paper to the Society on the 24th February, 1862. Two years after his retirement from the naval service on half-pay, in 1861, he returned to Central America, accompanied by two engineers, to explore the line of route across the sparsely inhabited forest-clad country, and the results of those surveys were given at the Newcastle meeting of the British Association in 1863. In 1867 he arranged in New York for the despatch of Mr. J. Collinson, C.E., one of his assistants on the former expedition, to proceed again to Nicaragua and make a more complete study of the route proposed for the railway, an account of which survey was communicated by Mr. Collinson himself to our Society in a paper read November 25th, 1867, and published in the 'Proceedings.' Ultimately the scheme fell through. Our deceased member was advanced to the rank of captain in 1868, and was compulsorily retired in 1870. With characteristic energy he then commenced to study for the profession of the law, and was called to the bar at the Inner Temple in January 1873. He entered Parliament as member for Gravesend in 1874; but did not seek re-election after the dissolution in 1880. In later years he travelled much in North America, and took a prominent part in the movement which led to an invitation being sent to the British Association to hold a meeting in Canada, which was effected in 1884. He was the author of the following works:—'An Earnest Appeal to the British Public on behalf of the missing Arctic Expedition' (1857); 'The Gate of the Pacific' (1863); 'The Negro and Jamaica' (1866); 'Dottings on the Roadside in Panamá, Nicaragua, and Mosquito' (1869). He was elected Fellow of our Society in 1852.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

BIRMINGHAM MEETING, 1886.

(*Concluded from p.* 669.)

Thursday, September 2nd.

The Extent, Topography, Climatic Peculiarities, and Agricultural Capabilities of the Canadian North-West. By Prof. JOHN MACOUN.—After sketching the geographical features of the North-west, the author said that owing to the regularity of surface the climate of that vast region was very uniform. The old plan of calculating the annual temperature of a place and then deducing from that its capabilities regarding the growth of cereals was now known to have no force over continental areas, and therefore did not apply to the Canadian north-west. The only measure of value was the temperature of the growing months, and the hundred days between the 10th May and the 20th August were the true test of temperature, and hence of production. Barley ripened on Peace river as easily as it did in Manitoba, although 500 miles further north, and was not an uncertain crop. Wheat seemed to ripen as well in lat. 61° as it did in lat. 49°. Owing to the uniformity of climate and soil the same species of the flora ranged through 20° of long. and 12° of lat., and any species growing in a clump of wood, by a river, or in a marsh at Calgary, could be gathered at Lake Athabasca 500 miles further north. With regard to the agricultural capabilities of the country, he showed how remarkably prolific all kinds of cereals were in the North-west. Wheat culture was profitable if the mean temperature of the two months July and August reached 60°, but in the north-west the temperature exceeded 60°, and as it extended over a very large area there was no reason why wheat culture might not extend to near the shores of Hudson Bay and down the Mackenzie to lat. 65°.

The Canadian Pacific Railway. By ALEX. BEGG.—The author explained the circumstances under which the federation of the British North American provinces was brought about, and gave some account of the acquisition by Canada of the north-west territories and the admission of British Columbia into the Dominion. He pointed out that the Trans-continental Railway through British territory was the very essence of the agreement between the different parts of Canada to unite under one system of government, and showed as a result of this the building of the Intercolonial and Canadian Pacific Railways, connecting the Atlantic and Pacific Oceans. He then proceeded to recount how the construction of the Canadian Pacific Railway, as a Government work, proved a failure, and that therefore the contract was entered into with the present Canadian Pacific Railway Company for the construction of the road. The condition of the north-west territories of Canada before and since the year 1881 was then described, showing that to the railway was due the rapid development which has taken place in so short a time. A large traffic in cattle and grain from the Western States of America was certain to flow through the channel of the Canadian Pacific Railway to the seaboard, and it would thus be an outlet for the produce, not only of North-Western Canada and British Columbia, but also for a large portion of the United States. Mr. Begg also demonstrated that the trade which had already commenced between Canada and Australia, China and Japan, viâ British Columbia, was likely to assume considerable dimensions, and to prove a very important source of revenue to the railway, and that the commerce also between Canada and the Australian Colonies was certain to be largely augmented by the

Canadian Pacific connection with the British Columbia coast. The Imperial aspect of the enterprise was then dealt with, and the author pointed out how great an advantage it was to Great Britain to have an independent route through British territory for the protection of her possessions in the East.

A New Trade Route between America and Europe. By HUGH SUTHERLAND (of Winnipeg).—The author said that the settlement and cultivation of the Canadian north-west had directed public attention in that country to the necessity of a new trade route to Europe. It had been found that a railway journey of 1800 miles before reaching a seaport was a serious drawback to the prosperity of that region, and placed the settler at a great disadvantage in competing with the other wheat-producing countries of the world. With the object of reaching a position of equality with those rival countries, an agitation was begun a few years ago to open up an outlet through Hudson Bay, and a railway has been projected from Winnipeg and Regina to Port Nelson, at the mouth of the Nelson river, which when completed would bring the north-west upwards of 1000 miles nearer the seaboard than it is at present. It was confidently expected that this new trade route, already in process of development, would create a revolution in the commercial traffic of the vast interior of that continent on both sides of the International boundary. Minnesota, Dakota, Montana, and Wyoming, with their immense productions of wheat and cattle, were naturally tributary to that route, as well as the whole of the Canadian possessions west of Ontario. The attention which had been given to the bay in consequence of this new project had resulted in increased knowledge of the resources of that great inland sea. Salmon, seal, whale, and walrus abounded in great numbers, while the coast regions of the bay and strait were rich in minerals. The region of country draining into James's Bay was covered with valuable timber. Besides offering a new and advantageous trade route between Europe and the interior of America, it was not improbable that the utilisation of those waters for such a purpose would soon be followed by the development of fish, timber, and mining industries of great and practically inexhaustible richness.

On the proposed New Route to the great Prairie Lands of North-West Canada *viâ* Hudson's Strait and Bay. By Dr. JOHN RAE.—The author said that the project of opening a new route through Hudson's Strait and Bay by steamer, and from the west shore of the latter by railway to Manitoba, was being undertaken with the motive of making a shorter and cheaper route for transmission of emigrants to, and for carrying grain and other products from, the prairie lands of Canada than the present means of transport by lake and railway by the St. Lawrence river and Strait of Belle Isle to England. Earnestly desiring that, if practicable, this great work should be carried out successfully, he feared that failure was more probable than success, and a failure would be an immense misfortune. There were a number of adverse circumstances that had either been entirely overlooked or not taken sufficiently into consideration. These difficulties were wholly connected with the navigation of the Hudson's Strait, and had nothing whatever to do with the navigation of the Bay nor with the construction of the railway from thence to Manitoba, both of which were easy enough. This route, if established, would shorten the distance by 400 or 500 miles, and would give about two days quicker time to a loaded steamer of ordinary speed; an advantage more than counterbalanced by a probable detention by ice of three or four days on each voyage through the strait. The disadvantages were the short time during which the strait was sufficiently open each season to allow a steamer to get through without much hindrance by ice, whilst on the other hand the great Canadian lakes were perfectly open for fully six months, and the Strait of Belle Isle was navigated for at least five months by the Allan

steamers; the danger to a large heavily laden steamer, whether of wood or iron, if caught in an ice-nip, and the higher rate of insurance consequent on such danger; and the uncertainty and rapidity of ice movements, which baffled the skill and experience of the oldest whaling captains, and were so well described by Lieutenant Gordon, who commanded the *Neptune* in 1884 and the *Alert* in 1885, on voyages of inspection of the intended new route. Lieutenant Gordon said that in the first half of July a steamer would take ten days to pass through the strait—a distance of 500 miles—or 50 miles a day! If that was correct, the new route would occupy longer time, be more dangerous, and less favourable in every way than that by the St. Lawrence.

A discussion then ensued on the subject of the four papers. Mr. TRELAWNY SAUNDERS said that Dr. Rae had always been opposed to the Hudson's Bay route, but he omitted to tell them that no one was more sensible of the difficulties than the Canadian Government. They sent out scientific expeditions for a succession of seasons, until the question was finally settled, so far as expeditions could settle it. He thought the Canadian Government might be safely trusted in the matter. The railway, if made, was bound to exercise an immense influence on the fortunes of the world—an influence which probably few foresaw, and the extent of which could not be measured.

Dr. GRANT (Ottawa) said that he introduced the Bill for the Canadian Pacific into the Canadian Parliament thirteen years ago. At that time the provinces of the Dominion hardly knew each other, the railway had now welded them together. The population of the North-west Territory was now rapidly increasing. Canada was determined to remain a portion of the British Empire. Canada was a splendid field for emigration, the climate was healthy, and in the north-west people generally died of old age. It was difficult for medical men to live by their profession.

Mr. D. J. BEATON (Winnipeg), who accompanied Lieut. Gordon to Hudson's Bay last year and the year before, said that when the new route had been accomplished a firm of British shipowners would at once establish a line of steamers to Hudson's Bay, and an insurance agent had expressed his willingness to accept the risk of insuring the vessels.

Mr. A. ROBERTSON (Montreal) said he had more faith in the St. Lawrence route than the Hudson's Bay route, but he hoped the latter would prove a success.

The discussion was continued by Mr. C. S. DRUMMOND (Winnipeg), Dr. J. EDMUNDS (London), Mr. R. M. BARRINGTON (Bray, Ireland), and Dr. HINGSTON (Montreal).

Friday, September 3rd.

On the Place of Geography in National Education. By DOUGLAS W. FRESHFIELD. See *ante*, p. 698.

Can Europeans become Acclimatised in Tropical Africa. By Dr. R. W. FELKIN.—The author said that with the exception of Cape Colony and a small portion of the north-west, the whole of Africa was in the tropical and sub-tropical zones, and could that region be colonised by Europeans it would be of great advantage to the civilised world. Acclimatisation was the process, oftentimes slow, by which persons became adapted to, and so retained health in countries having a different climate from those in which they were born. That acclimatisation might be in part effected by changes taking place in the individual or in the race, and in part by hereditary modification of constitution. In some places real acclimatisation was impossible, but in nearly all a person might accommodate himself for a certain time to almost any climate. The difficulties with which Europeans had to contend in tropical Africa were heat, moisture, malaria, special diseases in special districts,

&c. It was probable that southern European nations could withstand those obnoxious influences best. In tropical Africa there were great differences of climate. The coast-line and the banks of rivers for the first two hundred miles were most injurious to Europeans, and the difficulty of reaching the interior was the greatest hindrance to acclimatisation. He thought it was almost impossible for Europeans to do more than accommodate themselves to the coast climate for a short time; but given some means of rapid transport, such as a railway, to carry them over the dangerous belt of malaria on the coast, it would be quite possible for them to thrive in the mountainous regions and high plateaux of Central Africa, with proper care and sanitary surroundings. The climate of Central Africa was not necessarily more fatal to life than that of India.

In the course of a short discussion, Mr. J. THOMSON said he did not take the sanguine view of the colonisation of tropical Africa that Dr. Felkin did. He did not believe that any part of Central Africa could be colonised, if by colonisation was meant the ability to live and rear a family there. People might go there and stay for a few years, and then leave in a fairly healthy condition, but that more than that could be done he did not, from experience, believe. Experience in India had shown that there were no European descendants beyond the third generation. Unless they became intermixed with native blood, Europeans died out in the second or third generation. If that were so in India, he was sure it would be still more the case in Africa.—The PRESIDENT, after two or three months' residence on the Congo river, could not agree with the conclusions arrived at by Dr. Felkin in regard to the colonisation of Central Africa.

Further Explorations in the Raian Basin of Lake Mœris, and the Wadi Moéleh. By COPE WHITEHOUSE, F.R.G.S., F.R.S.L., &c.—In the 'Proceedings' of the Royal Geographical Society for November 1885, a map was published showing a "valley hitherto unexplored." This is the Wadi Moéleh, and completes the survey of the Raian Basin of Lake Mœris, first undertaken by the author of this paper in 1882. No European had penetrated into the desert to the west of Qasr Qeroun, prior to the 2nd of March, 1882. Belzoni (May 1819), Calliaud (November 1819), Pacho and Müller (1823), and Sir G. Wilkinson (1825), camped in the Oasis of Raian el-Kebir,* on their way to the Little Oasis. Their imperfect records were the only authority for the few vague and wholly erroneous outlines occasionally found on modern maps. After a lapse of forty-five years, Mason Bey (1870) traversed the Wadi Raian at the same point in an expedition to Siwah, sent by the Egyptian Government. Dr. Ascherson has given in the 'Zeitschrift der Gesellschaft für Erdkunde,' Berlin (No. 116, 1885), under the title 'Bemerkungen zur Karte meiner Reise nach der kleinen Oase,' a valuable historical summary as well as a description of his own visit in 1876. The map by Dr. Kiepert embodies the observations published in the Proc. Bib. Arch. Soc. London, 1882, p. 131, and the map drawn for the Am. Geog. Soc. 1882. No importance whatever had been attached to the valley; no point in it had been identified with any ancient record; no attention had been directed to its striking physical peculiarities. In January 1886, Dr. Schweinfurth traversed the greater part of the Basin, and the results are stated with characteristic thoroughness, at length, in the 'Zeitschrift der Gesellschaft für Erdkunde,' vol. xxi., No. 122, 1886. His description had been in part anticipated by Dr. Ascherson in the 'National-Zeitung,' March 18th (1885), under the title 'Cope Whitehouse's Hypothese über den Möris-See, und G. Schweinfurth's Reise

* Great Raian is distinguished from Little Raian by its amount of vegetation, not by the area of the basin.

zur Prüfung derselben.' In January and February (1886) a staff of engineers was detailed by the Government to accompany Mr. Cope Whitehouse, and a line of levels (*spirit level*) was run from Nile water in the Gharaq basin over the intervening ridge for about twenty miles. A point was reached, on the edge of a deeper basin, − 12·082 metres. The summit of the adjacent cliff was determined to be + 89·626. These figures fairly accord with the aneroid observations published in 1885. This line of levels was communicated to Dr. Schweinfurth, and appears upon the map which accompanies his paper to the Geographical Society of Berlin. In April a second expedition was made with Colonel Ardagh, C.B., R.E., and the general accuracy further corroborated. It is thus definitely established that at several points a short canal would put this basin in communication with the Nile. The proposal to convert it into an impounding reservoir for the Nile flood is receiving full consideration. It would be premature to give definite figures, but in round terms it would seem that a lake with a maximum length of 50 miles, and width of 22 miles, with the depth over a considerable area of not less than 2·50 feet, would be able to store and furnish at low Nile as much as a thousand million of cubic metres. Simultaneous with the filling of the lake, efforts would be made to redeem the flooded lands of the lakes Qeroun, Mareotis, Edkou, Bourlos, and Menzaleh, covering over 2000 square miles. History avers, and the evidence still remains of its truth, that each great canal in the drainage system of Lower Egypt once led to the sea, conducted with dykes across the low lands, the Holland of the Nile. Whether the Raian basin was utilised as a reservoir in ancient times and is the "Lacus Meridis" of the Ptolemaic maps, is an independent inquiry. The survey of the Wadi Moéleh shows that the Raian depression corresponds minutely to the shape and position of the ancient lake as given in the MSS. of Cl. Ptolemy. The ruins at the Deir Moéleh contain Roman remains, and must be identified with Dionysias. (See the Proc. of Soc. Bib. Arch., June 1886.)

The interest of the subject is intensified if the suggestions made at Oxford ('Oxford Review,' November 15th, 1885) and Cambridge (Communications of the Cambridge Antiq. Soc., vol. vi., pt. 2, No. 28) are well founded. In these papers and in the paper 'Le Bahr Youssouf d'après les traditions Mussulmanes,' read before the Institut Égyptien at Cairo, March 5th, 1886, the Hebrew and Arabic traditions were cited and discussed, which describe the great engineering works of the Patriarch Joseph. Genesis xlix. is, then, an account of the prosperity, in Egypt, of the relatives of the Patriarch who is compared to his own canal, a fruitful branch of the Nile. This canal permits the passage of 22 million cubic metres per diem, and must have run continuously for at least 3000 years. The original Arabic authorities are cited in an Arabic translation of this paper, made under the direction of the Minister of Public Instruction. It will facilitate the task of restoration by enlisting the co-operation of the Muhammedans. In the excavations in the Delta carried on by the Egyptian Exploration Fund, no remains of Jewish occupation have been found, and the Jews in the time of St. Jerome believed, as the Muhammedans do to this day, that their forefathers occupied the provinces of Minieh (Benjamin), Beni-Suef (sons of Joseph), the Fayoum (Pithom), and the adjacent valley of the Nile. The Exodus was only practicable with the permission of Pharaoh, who "let the people go," with "a mixed multitude," out of the Fayoum-Goshen, and aided them to cross the Nile into the Desert. No large body could traverse the fields and ditches of the Delta. The direct and indirect results of these explorations establish what has been heretofore published. The Lake Mœris of classical writers must be considered as consisting of two basins. The word Fayoum—Phiom—"sea," is the exact equivalent of λιμνη; Raian—"irrigation"—indicates the purpose of Mœri(s), while the word survives in Moéleh. In the time of Herodotus the Fayoum was not filled with

water. The Raian-Mœris alone served as the impounding reservoir described by him, as well as by Diodorus, Strabo, and Pliny.

Mr. E. G. RAVENSTEIN said he purposely abstained from criticising the author's work and theories. He merely wished to bring before the meeting a passage in Kalkashandi's work on Egypt, to which his attention had been directed by Dr. Schweinfurth. Kalkashandi, who died in 1418, stated that through a rise of the lake in the Fayoum, several villages had been flooded, and that it had been proposed to drain that lake to the south. An expert was sent to the spot, who demonstrated the impracticability of that scheme. This proved once more that there was nothing new under the sun.

The Rev. Canon TRISTRAM questioned some of the author's theories.

Recent Explorations in New Guinea. By Captain HENRY CHARLES EVERILL.—This paper dealt with the expedition organised by the Geographical Society of Australasia.

In the discussion which took place, the Rev. GEO. BROWN maintained that in the exploration of tropical islands the proper plan was to start from a spur of land running down to the coast, and not to follow the rivers. As an old resident in the South Seas, he questioned whether New Guinea would be of any real practical use to England or the Germans for many years to come. Still, he regretted that England did not secure the whole of it, as it was in proximity to Australia.

The Fiji Islands. By JAMES E. MASON.

New Britain. By the Rev. GEO. BROWN.

The Connection of the Trade Winds and the Gulf Stream with some West Indian Problems. By R. G. HALIBURTON.—The author said that countries where regular winds blew from one quarter continuously for months, as along the north-west coast of Africa (Morocco) and in the West Indies, were exposed to prolonged periods of defective rainfall. Droughts had prevailed simultaneously in Morocco and in Jamaica for several years in succession since 1879. Mr. David Morris, of Kew Gardens, had attributed the Jamaica droughts to the destruction of trees. The author suggested that they were due to more general causes, which might be discovered by founding meteorological stations on both sides of the Atlantic.

Monday, September 6th.

Remarks on a curious Album. By H. BEAUGRAND (Mayor of Montreal).—The remarks referred to an album, "Le Vieux Montreal," prepared by M. Morin and M. de Maisonneuve, and published in 1884. The "Album" contains 14 maps with explanatory letterpress, illustrative of the history of Montreal since its foundation. The most ancient of these maps is one of the Sault St. Louis, now called Lachine Rapids, by S. de Champlain, the founder of the city. The date it bears is 1611.

The Exploration of the Antarctic Regions. By Dr. JOHN MURRAY (late of the 'Challenger' expedition).—This paper appeared in full in the 'Scottish Geographical Magazine' for September 1886.

Telegraphic Enterprise and Deep-sea Research on the West Coast of Africa. By J. Y. BUCHANAN.

River Entrances. By HUGH ROBERT MILL, D.Sc. (of the Scottish Marine Station).—The author said, the want of a proper geographical definition of a river led to considerable difficulty in some cases, when it was of importance to know

exactly where the river ended and the sea began. That definition might be supplied by considering the physical conditions of the water. A preliminary classification of river entrances divided them into—those connected with inland seas, e. g. the Caspian; those connected with tideless enclosed seas, e. g. the Mediterranean; those connected with tidal seas. River entrances of the third kind were of most interest in this country. A typical river system of the third class comprised a river gradually widening and deepening as it merged into a funnel-shaped sea-inlet. Some rivers had no firth, others had neither firth nor estuary; the size, position, and character of each region depending on the ratio between the volume and velocity of fresh water in the river to the size and configuration of the sea-inlet into which it fell, and also to some extent on the weather and on tides. The only British river-system which had been pretty fully investigated physically was that of the Forth. The Clyde, Tay, and Spey had been examined in a preliminary manner; and the Thames, the Bristol Channel, the Wash, and the mouths of the Mersey, Ribble, Humber, and Shannon were worthy of special study. The observations required in such researches as carried on by the Scottish marine station were, temperature at surface, bottom, and intermediate depths; density of the water as a measure of salinity at the same places; amount of suspended matter and transparency; and alkalinity as a measure of dissolved calcium carbonate.

On the Configuration of the Clyde Water System. By Hugh Robert Mill.—This paper will be published in the 'Scottish Geographical Magazine.'

British North Borneo. By W. B. Pryer.

The River Systems of South India. By General F. H. Rundall, R.E. *See ante*, p. 681.

The Work of the Afghan Boundary Commission. By C. E. D. Black.

North China and Corea. By J. D. Rees.—This was the account of a journey from Taku to Peking, to the tombs of the Ming Emperors and the Great Wall, and down the Peiho to Tientsin. The voyage thence to Chamalpu, in Corea, and a description of that place and of Seul, the capital, formed the subject of the second part of the paper.

On Prejevalsky's Travels in Tibet. By E. Delmar Morgan.

Universal Time: a System of Notation for the Twentieth Century. By Sandford Fleming, C.M.G., LL.D.—This paper will appear in the Smithsonian Reports for the year 1886.

Tuesday, September 7th.

A Journey in Western Algeria, May 1886. By Colonel Sir Lambert Playfair, H.M. Consul-General for Algeria and Tunis.—The author started from Beni Saf, the newest and most westerly harbour in the colony, which has lately been called into existence by the rich deposits of magnetic iron ore in the district. Whole mountains are being blasted and carried away; during 1885 more than 300,000 tons were exported, chiefly in British vessels; and so perfect are the loading arrangements that 1600 tons are usually put on board daily.

Proceeding westward in an open boat, he visited the island of Rashgun, the mouth of the Tafua, and the interesting Arab ruins of Hosn Honai. This city was founded about the middle of the twelfth century by Abd el-Mumen, the first sovereign of the Moahidin dynasty, whose government extended from Morocco to Tunis, and embraced the south of Spain, Granada, Cordova, and Murcia. He himself was born in the neighbourhood, and, as an act of royal favour, he exempted

the city of his creation from imposts of every description. It became the port of Tlemçen, and was frequented by galleys from every port of Barbary as well as from Genoa and Venice. It was finally deserted on the occupation of Oran by the Spaniards in 1509. The *frisé* walls are still standing, and enclose an area of 17 acres; now a beautiful tangle of fig-trees and flowering shrubs, with abundance of clear running water.

The author drew particular attention to the extraordinary and hardly fortuitous occurrence of Jewish names in the district. Procopius mentions that in his time two pillars existed at Tangier with the inscription, *We flee from the robber Joshua, the son of Nun.* Here we have Cape *Nun*, a marabout dedicated to *My Lord Nun*; another to *Our Lord Usha*, a village of *Sidi Aissa*, and a tribe called *Ulad Ishu*, the last three being different forms of the word *Joshua*. A little further west is the tribe *Ulad Hauren*, or *Children of Aaron*, who are said to possess a distinctly Jewish type.

He landed at Nemours, the last town on the coast, and thence, proceeding south, he arrived at Lella Maghnia, an important frontier post. Close to Nemours may be seen a rude but interesting monument covering the remains of the column commanded by Colonel Montagnac, which was exterminated by Abd el-Kadir in 1845. At 16 kilometres from the sea is the remarkable Berber city of Nedroma, surrounded with *frisé* walls exactly like Honai. Until the last few years it was inhabited exclusively by natives, but a few Europeans have lately settled there; and it will probably soon lose its Berber character, which now makes it so interesting.

The author gave an account of the disturbances which have lately occurred within the frontier of Morocco and of his journey to Tlemçen by a new route only just opened to traffic.

From Tlemçen he visited Sebdu and the mountains of the Beni Snus, where he was hospitably entertained by *The Old Woman*, as she is affectionately called, the widow of Si Mohammed bin Abdulla, Agha of the Beni Snus, who was murdered by Captain Doineau, chief of the Bureau Arabe of Tlemçen in 1856. The affair created great sensation at the time. Doineau was convicted and sentenced to death, a penalty commuted to perpetual exile from France.

Mr. Douglas Freshfield, in proposing a vote of thanks to Colonel Sir L. Playfair for his paper, pointed out that it had an interest beyond its intrinsic importance, as showing how within a few days of England there were still fields for geographical research. He illustrated further this fact by a brief account of a four days' walk he had himself taken in the preceding May, through the Kebyle Highlands, over paths in great part unknown to Englishmen. Travel (the speaker continued) might be compared to the magic palace of the Arabian Prince, every window of which commanded a distinct landscape; but it showed us sometimes not only regions distant in space, but also carried us backwards in time. Thus in the Hauran the traveller found himself in the days of Job; in Mingrelia in the feudal ages, when nobles rode armed, surrounded by their retainers; among the Kebyles, a primitive people who were in Africa before the Romans or the Phœnicians, he might fancy himself in the days of Ulysses, whose land of the lotos-eaters Sir Lambert Playfair had recently identified in an island of the Gulf of Kabes.

Recent French Explorations in the Ogowai-Congo Region. By Major R. De Lannoy de Bissy. Will be published in the December number of the 'Proceedings.'

Niger and Central Sudan Sketches. By Joseph Thomson.—In this paper the author described his impressions of the lower part of the Niger and of the Central

Sudan, acquired in the course of a commercial and political mission last year to the Sultans of Sokoto and Gandu. In his way along the west coast of Africa the author noted the influence for good or evil which contact with white men has had upon the natives, and concludes that while there is much we have reason to be proud of, there is still more that we ought to feel ashamed of. He expressed the opinion that for every negro the missionaries have influenced by Christianity, a thousand have been driven into deeper degradation. He also found the settlements absurdly overgoverned on a system totally unsuited to the peculiarities of barbarous races. That part of the Niger which the author traversed is divided into three sections, according to their physiographical features. (1) The Delta; (2) the low-lying region between the Delta and the coast mountains, and (3) the irregular valley which has been cut out of the interior plateau. The characteristics of each section were sketched. On reaching Lokoja at the confluence of the Benué with the Niger and the commencement of the third section, the Central Sudan is entered. The changes which occur here, whether physiographical or ethnological, were noted as being striking in the extreme. "Behind us are the unwashed barbarous *sans-culottes* of the Coast region, with fetishism, cannibalism, and the gin-bottle in congenial union; before us lies a people astir with religious activity and enthusiasm, and wonderfully far advanced in the arts and industries." Mr. Thomson took occasion to point out the enormous influence for good—though not unmixed—which Mahommedanism exercises among the natives of the Central Sudan. On reaching Rabba, in the Nupé country, the author's river journey ended, and the journey to Sokoto had to be continued by means of the ordinary African caravan. The difficulties with the porters were described, and the countries traversed were sketched, the route being through Nupé, and Yauri to the Gulbi-n-Gindi which is then followed to the neighbourhood of Sokoto. In conclusion, the author described the commercial prospects of these parts. He expressed the opinion "that in all the wide range of tropical Africa there is no more promising field for commerce than this semi-civilised region which forms the central area of the Niger basin." He came to these conclusions not on the ground that it is more fertile or more rich in natural productions—though in these respects comparing favourably with other parts—but for other reasons. These might be briefly summarised as follows:—(1) It is more densely populated than any other part of Africa, and divided into powerful and for Africa exceedingly well-governed empires, in which life and property is almost are sacred as in Great Britain. (2) The peoples are far advanced in civilisation, and throughout Northern Africa are famed for the excellence of their various manufactures. (3) The necessary machinery and organisation to work the inland trade is ready to hand, as the Haussa trader is famed for his commercial genius and enterprising spirit. (4) An efficient transport service already exists, as the horse, camel, bullock, and donkey flourish in their thousands. (5) Owing to the much sterner conditions under which the people live, labourers are to be found without stint. (6) The river Niger presents an uninterrupted waterway into the very heart of this region. (7) The country, for Africa, is eminently healthy, especially away from the immediate neighbourhood of the rivers. While thus presenting such a favourable view of the prospects of the Central Sudan, the author is careful to warn people that African trade is not to be developed with a sudden rush, but as the result of forethought and careful plodding.

Recent Explorations in the Southern Congo Basin. By Lieut. R. Kund.—The monster river-system of the Congo, first revealed to the world through Mr. Stanley's adventurous journey, is rapidly becoming known in all its arteries through boat expeditions such as those undertaken with such brilliant success

by the Rev. G. Grenfell of the Baptist Mission, and by Lieut. Wissmann on behalf of H.M. the King of the Belgians. But all these river voyages fail to give us sufficient information about the nature and quality of the broad tracts of country which lie between the rivers, or of the tribes who dwell away from their banks. Although, therefore, the large blank space which had as yet figured on the map as the territory of the Congo basin will soon be filled up with newly drawn river lines, and with a swarm of names of tribes, yet on further consideration it will be admitted that our actual knowledge of that territory was still very defective. Essential amplifications of our knowledge of the Congo basin could for the future only be expected by means of great overland journeys, such as that which Livingstone accomplished. Lieut. Kund was sent out by the German African Association, his intention being to penetrate into the great territories lying east of Stanley Pool, which had up to this time remained unexplored. Having overcome the reluctance of the carriers procured at Loango, he set out from Stanley Pool, accompanied by Lieut. Tappenbeck and ninety men, guiding their steps entirely by the compass. The country through which they passed during the first two months was mountainous, with deep and sharp-cut river valleys. It rose towards the south, and the summits reached gradually to a height of more than 2600 feet; the water-currents were numerous, and always accompanied by narrow fringes of trees; trees also occasionally crowned the hill-tops, but most of the land was covered with grass, now and then interspersed with stunted trees. In general, the country was thinly populated, and gave an impression of poverty. Most of the villages were small, and nearly all built on the heights. Sometimes they came across tracts of more fertile land, where the people were evidently better off. Often the natives were unfriendly and tried to hinder their progress. They accompanied them on the march for hours together, with incessant hubbub.

After passing the Kwango they were astonished to hear from the natives that they would soon meet with another large river called the Wambu. Here they met with a caravan of Busombo, who trade between Ambriz and the interior, and who were much astonished to find white men so far inland. It was probably due to the ill-will of these people that one day, while passing a village, they were attacked without having given the least provocation. The Wambu, where they crossed it, was of considerable depth. After nine days' further travelling they reached the Chia, a river nearly as large as the Wambu, and undoubtedly navigable for a considerable distance. At that point they met with the first cannibal tribes, of whom so much had been related to them while on the march. These tribes at first appeared to be very mild and gentle, and their carriers soon lost all fear of the much-dreaded cannibals. The people stared at them and then made off as fast as they could. Subsequently they arrived at the river Kuilu, on the banks of which stretch larger forests than had previously been seen, abounding in elephants and buffaloes. The natives do not venture to attack these formidable animals with their bows and spears, and elephants may occasionally be seen walking through a village. According to the information given by the natives, the rivers Kwango, Wambu, and Chia join the Kuilu, and the latter flows into the Sankuru. The Sankuru is undoubtedly the river about which the Arabs spoke to Livingstone at Nyangwe. The natives showed themselves very unfriendly, and occasionally attacked the camp. They refused point-blank to assist the party in crossing the river, and they were therefore obliged to build a boat, in which, going from island to island, and struggling against a strong current, they managed to cross to the eastern bank. Traders never go beyond the Sankuru, which forms a boundary between the tribes. There is no association whatever between the people on either side of the Sankuru. The character of the country changed entirely after the party had marched several days beyond this river. It

was covered with uninterrupted primeval forest, the eastern extremity of which they failed to reach, although they devoted two months to its exploration. One day, after marching fully eight hours in incessant rain, they suddenly came to a clearing planted with manioc; clear and open lay before them a street-village, extending far into the forest; the street was about fifty yards wide, and extended further than they could see. The huts, gable-roofed, stood squarely on either side of the street. At their back were neatly kept plantations of bananas; oil-palms rose beyond, and the background was formed by the giant trees of the forest in great variety. At first the people showed some intention of flying, but they got the better of their timidity and approached the party. Fine men like these they had not seen before. Their complexion was not black, but a brownish-red. They had remarkably short bodies, but long legs, and were for the most part handsome, with muscles finely developed. Their hair was in most cases long, parted in the middle, and plaited into tresses, which were first wound round the neck and tied into a knot upon the chest. That mode of wearing the hair gave the face a curiously feminine appearance. After they had once ventured to approach they exhibited none of the stupid fear or suspicion which the natives had until then exhibited. They faced the Europeans, holding a spear in one hand, and watching the proceedings with looks of astonishment. They had mostly an intellectual cast. Their dress was limited to an apron of grass cloth, and they had few ornaments. The tatooing consisted of three incisions at the root of the nose. They possessed no European articles. Their houses were larger than any yet seen, built with more care and kept clean; the village street was swept, and there were round pits for refuse of all descriptions. The travellers were supplied with plenty of provisions, and given to understand that they were not to enter the other end of the village. The natives had taken their women there, and were engaged in sending the ivory after them. Ivory was to be had in plenty, and the travellers bought some of it very cheaply. The tribe converted tusks into large horns, the sound of which the party had frequently heard during the night when on the Sankuru; and they also carved pestles out of ivory for pounding manioc. The name of the tribe was Zenge. Further to the east the party passed through a village like that described at intervals of every two or three hours. The primeval forest continued to cover the whole country, the only clear spaces in it being the villages, for which the clearings had been made. The party also remarked later that the tribe possessed a political organisation, under the government of a somewhat powerful king, the Gakoko. The Zenge are far more civilised than the tribes further west. Their notions of comfort are more developed. In all their houses were wooden bedsteads, whilst the people to the west of them generally sleep on the floor. The disappearance of the fetishes or idols struck them very much, for on the Sankuru there was not a hut without its roughly carved idol, two or three feet high, and painted red. Traces of cannibalism, such as is practised between the Chia and Sankuru, had disappeared with the idols. The dead are buried by preference along the roadside. The graves are easily recognised by the heaps of manioc roots which cover them, and by the calabashes filled with palm wine. On one occasion they saw a coffin in a hut. It had the shape of a canoe, and was painted red, with white spots. The arms consist of bows and arrows, spears, javelins, heavy trumbaches, and occasionally clubs, which are hurled at the enemy. Their shields are as high as a man. They have wooden arrows with poisoned heads, but only appear to use them when their iron-headed arrows, which carry further and hit more surely, have been exhausted. They are clever hunters, and train the dog to follow game. Their skill as wood-carvers astonished Lieutenant Kund and he brought home two wooden cups representing negro heads, and of such superior workmanship that they might be taken for European products. The tribe

also works in iron with much skill. Of domestic animals they saw goats and fowls, and also dogs, and they were in better condition than in the west. Occasionally they saw a cat. Further towards the east they came on some tribes of remarkably small stature. The position of the travellers in these interminable forests soon became dangerous because of the enmity of the natives, who although much astonished at the European goods would not give the bare necessaries of life in exchange for them. The most important discovery made on going further eastward was that of another larger river, called by the natives Lukenje or Lukatta. In three different places the party crossed the river, and each time found it uninhabited on the opposite bank. That agreed with what they had heard from the natives, who told them they knew nothing about any people dwelling in a northerly direction. It was their intention to go still further east overland, but circumstances compelled them to retreat. After a hostile encounter with the natives in the course of which Lieutenant Kund was hit by three arrows, and his companion Tappenbeck narrowly escaped death in a hand-to-hand struggle with a native, they determined to build boats and to trace the Lukenje to the Congo. After a voyage of ten days they found themselves, to their surprise, on the very river which Stanley had ascended on his way to Lake Leopold. The Lukenje river must be regarded as a very important river. Its breadth and depth gave them reason to believe that it reached far beyond the point from which they started, and was probably navigable very far to the east. In conclusion Lieutenant Kund said he forbore from entering into further particulars of his journey, but his greatest wish was to carry on the work where he left it off, because he was sure that explorations by overland journeys in the centre of the southern Congo basin would give results of the highest scientific value.

A Trader on the West Coast of Africa, and in the Interior. By R. CAPPER.—The author described his ascent of the river Niger fifteen years ago through hostile villages, and stated, that whereas the Niger trade in 1870 only amounted to 30,000*l.* annually, it was now believed to exceed two millions. He spoke of the importance of opening up the markets on the Congo, and advocated the building of a railway to connect the upper courses of the Niger and the Congo, to form a spine through the continent.

In the course of a discussion which followed the reading of these African papers, Mr. E. G. RAVENSTEIN spoke of the great importance of the discoveries made by Lieut. Kund, and pointed out that jointly with those of Wolff and Büttner, they had shed considerable light upon the earlier discoveries of the Portuguese and the Catholic missionaries. It seemed a pity that whilst they had in their midst explorers such as his friend Mr. Thomson, there should in too many instances be lack of the means which would enable them to carry on their explorations. Mr. Thomson was anxious to clear up the mystery which still enwrapt the lake of Samburu, and in fact the greater part of Galla Land, and he trusted that an early opportunity would be afforded him to make another successful raid into the African *terra incognita*.

The PRESIDENT, with regard to the civilisation of the Congo, said he should be glad to think that more Manchester goods than liquor went into the country, but he was afraid it was not the case. He also begged those who condemned the missionaries not to be too hard on them. To his knowledge the gentlemen conducting the Baptist Mission had done a great deal of excellent work on the Congo. It was true their explorations might not have brought about the dangers and difficulties incurred by the travellers; but considering that theirs was a peaceful avocation, and that they were missionaries, the manner in which they bore their privations was exceedingly creditable to them.

Bechuana Land. By Captain Conder, R.E.—The author gave an idea of the condition of Bechuana Land and the Bechuanas in 1885, when the southern portion of the country was created a Crown colony, after the pacification of the district by the labours of Sir Charles Warren, and then indicated the possible future of the country annexed, and of the neighbouring regions on the north, east, and west, in connection with the natural development of our South African Colonies, regarded not from a political but simply from a scientific point of view. He explained that at the time when in 1818 Dr. Moffatt commenced his labours, and about 1840, when Dr. Livingstone began to work and travel in Bechuana Land, the natives and their missionaries were constantly endangered by lawless incursions from the Transvaal. The relative position of the various tribes was then pretty much what it was at the present day, but great progress had been made during the past half-century in the settlement of Bechuana Land, and in the establishment of British authority in that remote and extensive region. It was to the force of English home opinion, to the labours of Sir Bartle Frere, Sir Charles Warren, and the able and single-hearted men who aided and followed Dr. Moffatt that that progress was mainly attributable, and the retrospect might well encourage those who took interest in the future of that colony to further efforts for the establishment of equitable rule and the development of the resources of the Bechuana country. Captain Conder gave an interesting and careful geographical description of the country; and after speaking of the fertility of the soil and describing the magnificent climate, pointed out that the country was well suited to European agriculturists. As regarded the natives, he showed that the Bechuana were not savages; they were settled tribes in the pastoral and incipient agricultural stage of civilisation, just emerging from the degradation of witchcraft to a simple form of Christianity. They had shown capacity for further improvement—a tendency to develop trade, and to till the arable lands. They were easily led and manageable by those in whom they placed confidence, and it could hardly be doubted that their labour would long be the best attainable in the country. The fact was that the colony presented us with a wide extent of fairly fertile land, possessing a splendid climate, suitable for Europeans, a sufficient rainfall, a peaceful native population, and means of access by railway which now extended to within sixty miles of its southern border. Time, patience, and steady rule, therefore, were all that were needed to create in Bechuana Land a future outlet for the more respectable element of our surplus population in England. The future of Bechuana Land was bound up with that of the adjacent regions of the Transvaal and Cape Colony; but that Bechuana Land and the Transvaal would ultimately become large British lands seemed to be indicated clearly by the past progress of our countrymen in South Africa, and by those advantages of climate and soil which must in the end attract the bolder spirits of a race to which expansion was dictated by the necessities of a teeming population.

The Panama Canal. By F. D. Lesseps.—This paper will be published in the 'Scottish Geographical Magazine.'

Reports of Committees.

Report of the Committee appointed for the Purpose of Drawing Attention to the Desirability of Further Research in the Antarctic Regions.—The Committee stated that they were of opinion that "it would be most essential before approaching H.M. Government with the view of urging the expediency of equipping such a naval expedition as would be required for the carrying out an exploration of such magnitude, interest, and importance, that the requirements for its success, and a plan of operations should be most carefully con-

sidered, and the results embodied in a written form for the approval of the Council of the Association, and for the information of the Government." The Committee, in order to give greater weight to their recommendations, recommended that their number be increased "in order to elicit to the fullest extent the opinions and to secure support from those conversant with the various branches of science which are to be investigated during an exploration which from its very important and serious nature, eminently merits the favourable consideration of this great and enterprising maritime nation."

The Committee, in accordance with this recommendation, has been enlarged, and now consists of Sir Joseph Hooker, Captain Sir George Nares, Admiral Sir Leopold McClintock, Mr. Clements R. Markham, General Sir Henry Lefroy, General J. T. Walker, Professor Flower, Professor Huxley, Sir William Thomson, General Strachey, Sir John Lubbock, Mr. John Murray, and Admiral Sir Erasmus Ommanney as Secretary.

Report of a Committee appointed for the purpose of taking into consideration the Combination of the Ordnance and Admiralty Surveys, and the production of a Bathy-hypsographical Map of the British Islands.—The Committee consisted of Major-General J. T. Walker, General Sir H. Lefroy, Sir William Thomson, Mr. Alex. Buchan, Mr. J. Y. Buchanan, Mr. J. Murray, Mr. Francis Galton, Mr. H. W. Bates, and Mr. E. G. Ravenstein (Secretary.) The Committee consider that the production of a plain outline map of the British Isles and surrounding seas on a scale of 1:200,000 would be desirable. This map is to be essentially a physical one. The principal heights and depths above and below the Datum level of the Ordnance Survey of Great Britain are to be inserted upon it, as also contours, at intervals of 200 feet, with subsidiary contours where they are necessary to give expression to the features of the ground. The map is to be tinted according to heights. The Committee also recommended that the Clyde Trustees and Harbour Boards be approached with a view to their undertaking the preparation of similar maps of the Clyde estuary, &c., on a suitably larger scale.

The Committee was reappointed and 25*l.* was granted to it, in order to enable it to prepare a specimen-sheet of the map proposed.

Geography at the Universities.—A Committee for the purpose of co-operating with the Royal Geographical Society in endeavouring to bring before the authorities of the Universities of Oxford and Cambridge the advisability of promoting the study of geography by establishing special chairs for the purpose, was appointed. It consists of the Rev. Canon Carver, the Rev. H. B. George, Captain Douglas Galton, Prof. Bonney, Mr. A. G. Vernon Harcourt, Prof. P. McKenny Hughes, the Rev. H. W. Watson, the Rev. E. F. M. McCarthy, the Rev. A. R. Vardy, Prof. Alfred Newton, the Rev. Canon Tristram, Prof. Moseley, and Mr. E. G. Ravenstein (as Secretary).

Report upon the Depth of Permanently Frozen Soil in the Polar Regions, its geographical limits, and relations to the present poles of greatest cold. By General Sir J. H. Lefroy, R.A., K.C.M.G. (Reporter).—The inquiry referred to the Committee necessitated reference to residents in many distant regions, and time must elapse before any large harvest of observations can be hoped for; nevertheless, the Committee are in a position to quote several valuable communications, especially one from Mr. Andrew Flett, adding materially to what was previously known on the subject of the extension of permanently frozen soil, or ground ice, in America.

It will be convenient to arrange the data now available, in their order of latitude.

1. Lat. 71° 18′ N., long. 156° 24′ W.—At the wintering station of the United States expedition of 1881–2, under Lieutenant P. H. Ray, United States America, that officer found the temperature of the soil 12° F. at 28 feet from the surface, and the same at 38 feet.

2. Lat. 68° N., long. 135° W.—At Fort Macpherson, on Peel river, Mr. Andrew Flett, who passed 12 years there, reports:—"The greatest depth of thawed-out earth I came across round that post was 3½ feet, 10th October, 1865. The greatest depth of frozen ground was 52 feet 3 inches, 27th September, 1867, near the mouth of Peel river. The bank had fallen in; at the bottom the perpendicular cliff, which I tried with a boat pole, was frozen as hard as a rock. A black sandy soil. The surface was not above two feet thawed-out. The cliff was measured with the tracking line." This account leaves it doubtful whether the frost may not have entered the soil from the face of the cliff. On the other hand it is evident that it extended to a greater depth from the surface than was measured.

3. Lat. 67° N., long. 142° W. on the Yukon.—The same gentleman writes:—"I spent 12 years on the Pelly or Yukon river, on the west side of the Rocky mountains. Round old Fort Yukon ground ice is found at 6 feet; this I have seen in the river banks in September where they had caved in; but no particular notice has been taken as far as I know by any one, unless it be Chief Factor Robert Campbell, now residing in Merchiston, Strathclair, P.O., Manitoba."

4. Lat. 65° N., long. 120° W.—On the Mackenzie river, about ten miles above the mouth of Bear river.—The same gentleman writes: "I have seen many land-slips on the Mackenzie, which more frequently takes place in rainy weather. July, August, and sometimes September: but I never examined them particularly excepting one, which we came near being buried by in camp. This was about the 15th August, 1876. By a pole, I found the bottom of the slide frozen hard, a grey clay and gravel mixed, *from where the earth broke off was not over 6 feet.* The surface soil sandy. Some way back from the river bank, the country is muskeg more or less, and by removing the moss by hand we came to hard frozen ground in August." The sentence printed in *italic* is somewhat ambiguous. It is understood to mean that the bank was not much more than six feet high, and was hard frozen at that depth; the depth to which the frost extended is therefore unknown.

5. Lat. 64° 20′ N., long. 124° 15′ W.—On Mackenzie River.—The face of a cliff from which a recent land-slide had occurred, was measured by the present reporter in June, 1844. The soil was frozen to a depth of 45 feet from the surface. (*See* 'Magnetic Survey,' p. 161).

6. Lat. 62° 39′ N., long. 115° 44′ W.—At Fort Rae, on Great Slave Lake.—Captain Dawson, R.A., observed the temperature of the soil monthly at his station of circumpolar observation, 1882–3. The following table contains his results:—

Months.	In Degrees Fahr.				Months.	In Degrees Fahr.			
	1 Foot.	2 Feet.	3 Feet.	4 Feet.		1 Foot.	2 Feet.	3 Feet.	4 Feet.
1882.	°	°	°	°	1883.	°	°	°	°
September .	40·6	37·9	36·1	34·5	February ..	11·1	21·2	24·5	26·3
October ..	32·5	32·7	32·5	32·3	March ..	9·5	20·8	22·7	24·8
November ..	23·9	29·1	30·9	31·3	April ..	18·9	25·2	24·3	25·3
December ..	15·8	24·6	28·8	30·8	May	34·0	32·0	33·8	30·5
					June	43·5	36·5	32·4	31·5
1883.					July	48·0	41·0	37·0	34·5
January ..	8·3	19·9	25·7	28·5	August ..	47·3	41·9	38·5	36·5

The mean temperature of the air at 5 feet 10 inches above the surface, in the same months, was as follows:—

1882.		1883.	
September	44·40° Fahr.	March	−7·71° Fahr.
October	32·59° „	April	19·30° „
November	9·30° „	May	36·30° „
December ..	−15·20° „	June	51·49° „
1883.		July	61·11° „
January	−26·80° „	August	56·50° „
February ..	−10·41° „		

We learn from this Table that the soil is frozen at a depth of 4 feet from November to June inclusive, and is at the lowest temperature at that depth in March. It further shows that, like the waters of the Scottish lakes, as proved by the observations of Mr. J. Y. Buchanan and Mr. J. F. Morrison in Loch Lomond and Loch Katrine last winter, the mean temperature of the soil reaches its minimum about the time of the vernal equinox. The rise of earth temperature in February above that recorded in either January or March is remarkable. It does not appear from the convergence of the lines when projected, that temperatures below 32° F. extend lower than 11 or 12 feet. Captain Dawson writes, "There are two reasons why these earth temperatures are above what is probably the average in that latitude. (1) The ground had a slope of $\frac{1}{16}$ to the S.W.; and (2) it was fully exposed to the rays of the sun; now, in most places, the ground is either covered with thick moss or shaded by brushwood, and its surface temperature in the hottest day is not likely to exceed 70° F., whereas, earth exposed to the rays of the sun may easily reach a temperature of 120° F." Fort Rae is situated on a long arm or inlet of Great Slave, having a depth of 10 or 12 feet of water.

7. Lat. 62°, long. 129° 40′.—Jakutsk, Siberia. The great depth of permanently frozen soil in this part of the valley of the Lena has long been well known; but the following extract translated from a recent paper by Doctor Alex. Woeikof, of St. Petersburg, entitled *Klima von Ost-Siberien*, contains information on the influence of local conditions which will make it of value to observers, and we therefore reproduce it.

"The further north," he remarks, "the longer is the duration of cold in valleys, in comparison with that on higher ground. The effect extends to a part of autumn and spring, and is observable in the mean temperature of the year."

The following observations of earth temperatures are a proof:—

	At Depth				Limit of
	20 ft.	50 ft.	300 ft.	381 ft.	Frozen Soil.
Jakutsk*	13·6°	17·1°	25·0°	26·6° Fahr.	620 feet.
Mangan mine	22·1°	25·2°	..	..	269 „
Schelon mine	22·1°	25·7°	..	..	298 „

Thus, on heights in the vicinity of Jakutsk, the earth temperature is from 8·1° to 8·6° F. higher than it is in the town and valley at the same depth, and it is even lower at 300 feet in the former than at 50 feet in the latter locality. The total depth of frozen soil is, according to Middendorf,† more than twice as great in the valley as it is on the heights: and observe that these lesser heights are in winter relatively colder than higher isolated mountains. Middendorf also states that no frozen soil

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* M. Schergin's shaft.

† 'Sibirische Reise,' bd. i.

was found at 60 metres above the level of the river at the mouth of the Maja, in Aldan, but that it was found about four miles and a quarter up the stream at three metres above the level of the river, and that about 28 miles further, in the mountains, there is a deep hollow from which aqueous vapour is constantly rising.

Kuppfer asserts that in Bergrivier Nertschinsk, in the Trech Swjatitilei mine, frozen soil was found at a depth of 174 feet, but that in Wossdwischenst mine, which lies 230 feet higher, the frozen soil ceased at 50 feet. Even in Altai it is acknowledged that many valleys are colder than the neighbouring heights.

Dr. Woeikof sums up a number of observations in the following sentences, which apply to the greater part of East Siberia, but more particularly to the north-east portion.

(1) As the greater cold coincides with calms and light winds, the valleys and lower grounds are colder than the heights.

(2) The temperature of isolated mountains is relatively higher than that of lesser elevations.

(3) The lowering of temperature in the valleys is so lasting and considerable that the mean of the year is also lowered, as is proved by the observations of earth temperature.

(4) The depth of the frozen soil is greater in valleys than on the neighbouring heights, probably also than it is on the higher mountains.

(5) In the Tundras of the far north (answering to the Barren grounds and Muskegs of the North-West Territory of Canada), the winter is warmer than in the valleys of the Forest-zone. Probably because the stronger currents of the air do not permit the cold stratum to remain so long stagnant.

8. Lat. 61° 51′, long. 125° 25′, Fort Simpson, on Mackenzie's river.—The summer's heat was found in October, 1837, to have thawed the soil to a depth of 11 feet, below which was 6 feet of ground ice (Richardson), making the depth of descent of the frost 17 feet. The result is anomalous; at other posts in the same region the summer thaw is much more superficial. Thus, it will be observed above, that in the month of October, at Fort Rae, the soil was at a nearly uniform temperature, but slightly above the freezing point, from the depth of 1 foot to 4 feet. Franklin found a summer thaw of only 22 inches at Great Bear Lake, and the writer was informed that it was only 14 inches at Fort Norman (lat. 64° 41′). Fort Simpson is situated on an island of deep alluvial soil, bearing timber of large size, and possessing an exceptional climate.*

9. Lat. 57°, long. 92° 26′, York Factory, Hudson's Bay.—Sir J. Richardson has stated that the soil was found frozen to a depth of 19 feet 10 inches in October, 1835, the surface being thawed to a depth of 2 feet 4 inches.

10. Lat. 55° 57′, long. 107° 24′. Lake à la Crosse.—It is stated that no frozen soil was found in sinking a pit to a depth of 25 feet in 1837, and that the earth was only frozen to a depth of 3 feet in the winter of 1841. Both records are anomalous, and call for verification.

11. Lat. 53° 40′, long 113° 35′. At Prince Albert, on the Saskatchewan.—Mr.

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* Lat. 61° 53′ 30″ N., long. 6° 46′ 30″ E. Faleide, Nordfjord, in Norway.—The following memorandum supplied by a recent tourist in Norway as the result of numerous inquiries on the Nordfjord in about lat. 61° 53′, shows, as we should expect, a remarkable difference in the penetration of frost in a high European latitude. "The ground at Faleide (on the Nordfjord) is frozen from one to two and a half feet deep about the Fjord in winter, but this depends upon how soon the snow falls. Higher up the mountains the ground is scarcely frozen at all, owing to the snow falling sooner, and in fact, if the snow falls very early lower down it is scarcely frozen to any depth."

W. E. Traill, who was in charge of this post in 1872, reports that a settler in the neighbourhood came to frozen ground at a depth of 17 feet, but did not learn whether they passed through the frozen strata, or, if such was the case, what was the thickness of it. The same gentleman, writing from Lesser Slave Lake (lat. 55° 33′), remarks that he has never come across any indication of perpetual ice during the twenty-two years he has passed in the North-west Territory.

13. Mr. Andrew Flett, writing from Prince Albert, April 21st, 1886, says, "Hundreds of wells have been sunk in this settlement; one I had sunk myself, beginning of July 1881, 27 feet deep, saw no frozen earth. As far as I have noticed on this prairie land, when there is a good fall of snow when the winter sets in, the frost does not penetrate so deep as when there is no snow till late, and in some years very light snow. I had a pit opened on the 9th inst. (April), the surface was thawed 3 inches, we got through the frozen earth at 4 feet 7 inches. On the 11th instant, I saw a grave dug in the churchyard at Emmanuel College, one mile from my place, five feet deep, and had not got through the frost. My place is on higher ground, loam soil."

14. Mr. W. Ramsay, settled on the South Saskatchawan, 35 miles from here, sunk a well 40 feet, May 27th, 1884, no frost.

15. Mr. Jos. Finlayson, 3 miles from here, sunk a well beginning of July 1882, 46 feet. He saw no frost.

16. Mr. J. D. Mackay, on the same section as the above, sunk a well 27 feet, July 15th, 1884, found particles of frozen earth at 7 feet deep.

17. Mr. W. C. Mackay, my next neighbour half a mile west of this, sunk a well about June 20th, 1884, found particles of frozen earth at 5½ feet.

18. Lat. 53° 32′, long. 113° 30′. Fort Edmonton, on the Saskatchewan, 2400 feet above the sea. Dr. James Hector, on March 5th, 1858, found the soil frozen to a depth of 7 feet 6 inches.*

19. Lat. 51° 14′, long. 102° 24′.—At Yorkton, Mr. J. Riaman, when digging a well last summer (1885), found the frost at a depth of 19 and 20 feet, and continuing for a depth of 30 inches. In this case, therefore, the total depth to which frost descended was about 22 feet. Mr. J. Tarbolton, of Yorkton, in communicating the last observation, remarks, "The depth to which frost penetrates during the winter, varies, I find, with the character of the winter itself and with the nature of the locality. I made observations in an open unprotected spot, where there was little or no snow, and found frost to the depth of 5 feet 9 inches. This occurred last July, and the frost was then about 2 feet deep. But in the bluffs near my house, I dug a cellar, at the same time, going down between 8 and 9 feet, encountering no frost at all.

"This year, however, when digging another well in April, in almost the same place, I encountered frost at two feet and the ground continued solid until I had gone down from four and a half to five feet from the surface. From this, and from the information I obtained from others, I am safe in saying that the frost penetrates here on an average of five feet, except when we have had a great depth of snow in the beginning of winter, in which case it does not penetrate nearly so far. The bluffs referred to are groves of poplar from three to six inches in diameter, on the edge of an open plain."

Mr. Charles Carpmael, Director of the Meteorological service of Canada, to whom most of the above reports were addressed, remarks, "We can easily imagine that at a depth of 17 feet at Prince Albert, there might be no frost at all in winter,

* Journal R. G. S., vol. xxx. p. 277.

but owing to the slow travelling downward of the wave of cold, it might have reached a depth of 17 feet in the early summer."

"It is easily seen that the annual mean temperature of the air might be considerably below the freezing point without the occurrence of permanently frozen soil, for in winter the soil is often covered deep in snow, so that the temperature of the soil might be but little below 32° although the temperature of the air were 30° or 40° F. below zero. Again, the heat which had entered the soil in summer would only be removed by slow conduction, whereas the summer heat would not only travel downwards by conduction, but be carried into the soil by percolation of the warm water through the surface."

20. Lat. 50° 30′, long. 103° 30′. The Bell farm, near Indian Head.—Frozen soil is said to have been met with in the summer of 1884 at a depth of 12½ feet, details are wanting.

21. Lat. 49° 53′, long. 97° 15′. City of Winnepeg and the neighbourhood.—Mr. Ch. N. Bell reports that frozen soil has been found as under in various cemeteries.

"Brookside Cemetery on the open prairie close to the city, soil rich black loam, varying in depth from one to two feet, subsoil heavy grey clay.

	On the Higher Ground. Ft.	In.	On the Lower Ground. Ft.	In.
December 23, 1884	Frozen to 0	10	2	2
January 3, 1885	1	0	3	0
March 21, „	1	4	3	6
May 6, „	4	4	5	0
June 25, „	None down to 6	0	6	0
January 14, 1886..	0	10	1	6."

A further communication of 1st June, 1886, states that the frost only descended 3 feet 6 inches on the higher ground in the winter of 1885–6, and had at that date disappeared. It descended 5 feet in the lower ground, but had almost disappeared.

At St. John's Cemetery in the city, "I am advised by the clergyman," says Mr. Bell, "that frost has been found at from five to eight feet depth"; careful investigation will be made there this year.

St. Boniface, a suburb of Winnipeg to the east.—The frost penetrates from five to eight feet, according to the season, varying locally under the conditions of the exposure, tillage, dryness, and heat or frost cracks. During the summer of 1885 frost was found at a depth of five feet, and down to seven feet, when the work was stopped. This was in July or early in August. The locality was probably exposed to the action of the sun.

22. Lat. 49° to 49½° long. In the valley of the river Pembina to the extreme south of the North-West Territory.—Dr. Alfred Selwyn, Director of the Geological Survey of Canada, who has two sons settled in this region, states that those gentlemen have had several wells sunk, the deepest about 40 feet, and have never seen any permanently frozen ground. There is similar negative evidence from Brandon, a little further north.

It would be premature to draw any general conclusions from the observations thus far collected. There is want of proof of the existence of permanent ground ice beyond the district of Mackenzie's river in the North-west, but frozen soil has been shown to exist at a depth of 17 feet at Fort Simpson, at Prince Albert, and at Yorkton, and it may be questioned whether the wave of summer heat has time to descend to such a depth before it is overtaken by the refrigerating influence of the early winter. It certainly exists also in the neighbourhood of Hudson's Bay, on the

eastern side, and it is evident that under favourable conditions frost, without being permanent, may in some cases last in the soil all the year round over a wide area, and in other years disappear.

At whatever level we locate the maximum of absorbed heat, it must be remembered that when the winter sets in, and freezes the surface, which it does rapidly to the depth of a foot or two, the heat will then be abstracted in both directions, and its rate of descent checked.

The Committee was re-appointed, with additional names, as follow:—Lieut.-General J. T. Walker, C.B., F.R.S., General Sir J. H. Lefroy, Professor Sir W. Thomson, Mr. Alex. Buchan, Mr. J. Y. Buchanan, Mr. John Murray, Dr. J. Rae, Mr. H. W. Bates, Captain W. J. Dawson, R.A., Dr. A. Selwyn, and Mr. C. Carpmael.—Mr. H. W. Bates, *Secretary*; Sir Henry Lefroy, *Reporter*.

PROCEEDINGS OF FOREIGN SOCIETIES.

German Colonial Congress.—A Congress under the title of "The General German Congress for the promotion of Transmarine Interests" was held in Berlin from the 13th to 16th September, under the combined auspices of the central Society for Commercial Geography and the German Colonisation Society. The Congress, which was fairly well attended, received additional importance from the presence at its opening of a representative of the Imperial Chancellor. It was regretted, however, that the original idea of the Congress was so far departed from that extraneous subjects involving much discussion were introduced. With regard to the work of German colonisation in East Africa, it was stated that nine stations had been established and that the tobacco plantations were rapidly increasing. The proposal of Count Pfeil to call in the assistance of the more warlike tribes in order to compel the peaceful natives to take part in agricultural work, met with considerable opposition on account of the difficulties involved. Herr Büttner stated that the natives in south-west Africa had been induced to work at agriculture by far less drastic means. Considerable time was devoted to the emigration question. It was recognised that emigration was no loss to a country, provided the emigrants preserved their nationality, and remained consumers of the products of the mother-country. Ultra-tropical Brazil and south-west Africa were suggested as offering the greatest facilities for fulfilling these conditions. One of the most important results of the Congress was the formation of a council of 25 members, under the title of the "Allgemeiner Verband zur Förderung deutscher Interessen."

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

Baddeley, M. J. B.—Thorough Guide Series. Scotland (Part III.) The "Lowlands," including Edinburgh and Glasgow, and all Scotland South of those places. Twenty maps and plans by J. Bartholomew, F.R.G.S. London, Dulau & Co., 1886: 8vo., pp. xi. and 179. Price 4*s*. [Presented by the Publisher.]

In this new volume of Mr. Baddeley's well-known series of guides his descriptions of Edinburgh and Glasgow are repeated from Part I. of Scotland.

Mr. Baddeley notes justly that "Lowlands" is only a comparative term, many parts in the centre of the district so named being as hilly as any part of the Highlands, though the summits are not so lofty nor the slopes so rugged. The Guide seems as conscientiously and intelligently done as the previous volumes of the series; though we must say that it would be improved if more precise information were given as to hotel accommodation. In this respect Mr. Baddeley might well take Baedeker as an example. The maps and plans by Bartholomew are nearly all that could be asked.

Boehmer, George H.—Observations on Volcanic Eruptions and Earthquakes in Iceland within Historic Times. Translated and condensed from a History by Th. Thoroddsen. From the Smithsonian Report for 1885. Washington, Government Printing Office, 1886: 8vo., pp. 47. [Presented by G. H. Boehmer.]

AFRICA.

Arthur, G.—Société de Géographie de Lisbonne. Le Congo. Lisbonne, Typ. de Adolpho, Modesto & C^a^, 1886: 8vo., pp. 18.

Plunkett, [Major] G. T. [R.E.]—Vocabulary English-Arabic. Compiled for the use of English Residents and Travellers in Egypt. Cairo, Hannah & Co., 1886. [London, Richardson & Co., Pall Mall.] Small 8vo., pp. 108. Price 2*s.* 6*d.* [Presented by the Author.]

This useful vocabulary is the result of Major Plunkett's own experience of what a traveller requires in Egypt, and is therefore likely to be of practical utility. It is worth noting that the book was "printed by Corporal W. Cook, R.E., at the Field Printing Press, Assuan, Upper Egypt," probably the first book printed there.

Shaw, George A.—Madagascar of To-day. An account of the Island, its People, Resources, and Development. With five illustrations. [London] The Religious Tract Society, 1886: 32mo., pp. 190. Price 6*d.* [Presented by the Religious Tract Society.]

This little volume, forming No. 11. of the Religious Tract Society Library, is a reprint of the most useful and instructive portions of the author's larger work, 'Madagascar and France,' published in 1885. The matter it contains is chiefly historical, but there are some interesting facts regarding the country, its products and adaptability for foreign enterprise and commerce, the people, their character, habits, employments, and advance in civilisation and Christianity. The Appendix is devoted to the subject of meteorology.

AMERICA.

[America.]—Narrative and Critical History of America. Edited by Justin Winsor, Librarian of Harvard University. London, Sampson Low & Co., 1886: imp. 8vo., vol. ii., pp. ix. + ix. and 640; vol. iii. pp. xi. and 518. Price 30*s.* per volume.

The first volume of this great undertaking is not yet published; it will deal with Prehistoric America, and, like the volumes before us, will be the work of a number of specialists. The present work, though covering the ground of the gigantic history of Mr. H. Bancroft, is of a very different character. Mr. Bancroft brings together from all sources, without much critical sifting, a vast array of materials bearing on the history of the Pacific States. The work edited by Mr. Winsor, which is intended to cover the whole of America, is thoroughly critical in its character. Mr. Winsor and his coadjutors take the most comprehensive view of what "history" means in the case of America, and rightly give a prominent place to the history of its discovery and exploration. These two volumes, indeed, are to a large extent occupied with the discovery and opening up of the New World during the two centuries from 1492 downwards. At the same time the historical purpose of the work is never lost sight of, and, therefore, details of geography and exploration are gone into only so far as they

seem to throw light on history. The work, however, is on so large a scale that the geographical element occupies a place of considerable prominence. For the various sections of the work, and even for each division under each section, specialists of reputation have been engaged, the result being a series of studies of the successive periods of American history, which, if perhaps somewhat wanting in continuity and uniformity, have all the value of original investigations, and will therefore be of the greatest service to the student. As the most copious references are given to original authorities, the work will be of great use to any one wishing to carry his investigations further. The general plan under each section is to give a fairly full historical statement, followed by a critical essay discussing the points thus raised, and by notes on special points. In volume second, which deals with the Spanish explorations and settlements in America from the 15th to the 17th century, there is an introduction on the Documentary Sources of early Spanish-American History by Mr. Justin Winsor. Chapter I. deals with Columbus and his discovery, by the editor, the general narrative being followed by a Critical Essay, Notes, a Postscript discussing M. Harrisse's work on Columbus, and a section on the earliest maps of the Spanish and Portuguese discoveries. Chapter II., by Sidney Howard Guy, deals with Amerigo Vespucci, the editor following with notes on Vespucius and the naming of America, and a bibliography of Pomponius Mela, Solinus, Vadianus, and Apianus. In Chapter III. the companions of Columbus are dealt with by Edward Channing, who also writes the critical essay, the editor adding a section on the early cartography of the Gulf of Mexico and adjacent parts. Ancient Florida, by John G. Shea, is the subject of Chapter IV., and Las Casas, by George E. Ellis, of Chapter V. In Chapter VI. Mr. Winsor deals with Cortes and his companions, and with discoveries on the Pacific coast of North America. Early explorations in New Mexico, by Henry W. Haynes, form the subject of Chapter VII. In Chapter VIII. the subject of Pizarro and the conquest and settlement of Peru and Chile is appropriately dealt with by Mr. Clements R. Markham, the editor adding a section on the Amazons and Eldorado. The last chapter treats of Magellan's discovery, by the Rev. Dr. E. Hale.

The third volume is devoted to English explorations and settlements in North America, 1497–1689. The first chapter refers of course to the voyages of the Cabots, and is written by Dr. Charles Deane. The subject of Hawkins and Drake is treated of in the second chapter by the Rev. Dr. Hale, the editor supplying notes on the sources of information. Chapter III., by Charles C. Smith, deals with explorations to the north-west, the editor adding a short sketch on the Zeno influence on early cartography, and on Frobisher's and Hudson's voyages. William W. Henry treats of Sir Walter Raleigh in Chapter IV., while Virginia, 1606–1689, is dealt with by Robert A. Brock in Chapter V., the editor adding notes on the maps of Virginia; and Norumbega and its English explorers in Chapter VI. by the Rev. B. F. Da Costa. The religious element in the settlement of New England forms the subject of Chapter VII., by George E. Ellis, and the Plymouth Church and Plymouth Colony of Chapter VIII., by Franklin B. Dexter. Chapter IX., a long one, is devoted to New England, by Dr. Charles Deane, and is followed by chapters on the English in New York, by John Austin Stevens; the English in East and West Jersey, 1664–1689, by William A. Whitehead, with note on New Albion, by Gregory B. Keen; the founding of Pennsylvania, by F. O. Stone; and the English in Maryland, by William T. Brantly. Each volume is followed by a copious index.

This *résumé* will give some idea of the scope and method of this important undertaking. Where there are so many writers, it cannot be expected that the treatment will be equal throughout. Some of the writers do not seem so critical as others; for example, the common version of the introduction of tobacco and the potato into England is accepted, without any apparent examination of the evidence. Still the work may be accepted as throughout sound and trustworthy, a storehouse for the student of early American history. Probably no similar work was ever so lavishly illustrated. Portraits, early maps, autographs, views, instruments used in early navigation—everything in short likely to throw light on the text has been put in the form of illustra-

tions, where that was possible. As much critical care has been given to the selection of these illustrations as has been bestowed on the text. Many of them are rare and valuable, and must have cost much trouble to obtain. We have for example, nine portraits of Columbus, and a reproduction of numerous old engravings relating to himself and his voyages. The whole get-up of the work is worthy of its character.

Derby, Orville, A.—Contribução para o Estudo da Geographia physica do Valle do Rio Grande. Extrahido do Boletim da Sociedade de Geographia do Rio de Janeiro, Tomo I, N. 4. Rio de Janeiro, 1885: 8vo., pp. 30. [Presented by the Author.]

Hugues, L.—Il Quarto Viaggio di Amerigo Vespucci. Roma, Presso la Società Geografica Italiana, 1886: pp. 23. [Presented by the Author.]

WEST INDIES.

Clark, Henry James.—Trinidad. A Field for Emigration. Port-of-Spain, Government Printing Office, 1886: 8vo., pp. 34. [Presented by Charles Elms.]

ARCTIC.

[Eigner, A.]—Beobachtungen der Russischen Polarstation an der Lenamündung. II. Theil. Meteorologische Beobachtungen, bearbeitet von A. Eigner. I. Lieferung. Beobachtungen vom Jahre 1882–3. Herausgegeben unter Redaction von R. Lenz. 1886: pp. 157, with phototype of the Russian Polar Station, map of the Delta of the Lena, and plates. Text in Russian and German.

In pursuance of the programme laid down by the International Polar Conference at St. Petersburg in 1881, a party of three Russian observers (Lieut. N. D. Jürgens, A. G. Eigner, and Dr. A. A. Bunge), proceeded in the autumn of 1882 to establish a station on the Island of Sagastyr off the Lena delta in Eastern Siberia in lat. 73° 22′ 48″ N. and long 124° 5′ E. of Greenwich.* Here observations have been taken daily and hourly for two years, and the present number, edited by R. Lenz, contains the meteorological observations for the first year, September 1882 to August 1883, computed by A. Eigner, viz. the barometer readings, moisture of the atmosphere, direction and force of wind, nebulosity and cloud forms, atmospheric deposits, &c., temperature on the surface of the snow, temperature on the surface of the earth, temperature of the earth at certain depths below the surface.

The whole of the publications will extend to three volumes. Of these the first, not yet ready, will contain the observations on terrestrial magnetism; the second, of which part 1 has appeared, will be devoted to the meteorology; the third will comprise facultative observations (not obligatory for the station); among these will be inserted numerous and careful observations on aurora borealis. The meteorological observations, though appearing before the others, nevertheless form the second volume, because it is proposed in the first to give in a detailed preface the history of the undertaking, and as this will take some time to prepare, its publication is deferred till all the observations are ready for press. The first two volumes will each contain two numbers, the first containing the results of observations in 1882–83, the second those for 1883–84.—**[E.D.M.]**

[Fort Rae Expedition.]—Observations of the International Polar Expeditions, 1882–83. Fort Rae. London, Trübner & Co., 1886: 4to., pp. xiv. and 326, plates. Price 21*s*. [Presented by the Meteorological Office.]

The observations recorded in this volume were made by the English expedition at Fort Rae, under Capt. H. P. Dawson, R.A., during the twelve months

* The corrected position of the observatory as given in this number does not agree with Lieut. Jürgens' determination—cf. 'Proceedings R.G.S.,' 1883, p. 232—nor with the map.

extending from September 1st, 1882, to August 31st, 1883. Fort Rae, one of the posts of the Hudson's Bay Company, is situated in lat. 62° 38′ 52″ N., and long. 115° 43′ 50″ W. on a bay on the northern shore of the Great Slave Lake. It formed one of the series of circumpolar positions occupied in accordance with the scheme proposed by the late Lieut. C. Weyprecht, for concerted physical observations to be carried on for at least a full year at different stations situated around the Poles. The observations recorded are meteorological and magnetical.

[Jan Mayen.]—Die Oesterreichische Polarstation Jan Mayen ausgerüstet durch seine Excellenz Graf Hanns Wilczek, geleitet von k. k. Corvetten-Capitän Emil Edlen von Wohlgemuth. Beobachtungs-Ergebnisse herausgegeben von der k. Akademie der Wissenschaften. II. Band. I. Abtheilung. Wien, Gerold's Sohn, 1886: 4to., pp. 232. [Presented by the Imperial Academy of Sciences.]

The first and third volumes of this publication have been noticed in previous numbers ('Proceedings,' August, p. 537, and October, p. 673). The present volume is devoted to observations of the aurora borealis, and to spectroscopic work, and is by Lieut. Adolf Bohrek von Boldva. There are twelve very fine lithographic plates, and 69 woodcuts.

AUSTRALASIA.

[Queensland.]—Colonial and Indian Exhibition, 1886. Queensland: its Resources and Institutions. Essays; prepared by the Authority of the Executive Commissioners in Queensland. Edited by Price Fletcher. London, Wm. Clowes & Sons, 1886: 8vo. [Presented by Sir James F. Garrick, Executive Commissioner for Queensland.]

The following essays are included in this volume:—Queensland; an Introductory Essay, by A. J. Boyd; Education in Queensland, by the Rev. William Poole; the Commerce and Industries of Queensland, by Horace Earle; the Mineral Industries of Queensland, by K. T. Staiger, F.L.S., &c.; Agriculture in Queensland, by Price Fletcher; the Sugar Industry of Queensland, by ditto; the Pastoral Industry, by P. R. Gordon, Chief Inspector of Stock, &c.; Horticulture, by Theodore Wright; Hints to Immigrants: a Practical Essay upon Bush Life in Queensland, by Price Fletcher; the Flora of Queensland, by Frederick Manson Bailey, F.L.S., Colonial Botanist; the Geology of Queensland, by R. L. Jack, F.G.S., &c., Government Geologist; a Contribution to Pharmacy from Queensland, by Joseph Bancroft, M.D.; the Natural History of Queensland, by Price Fletcher; Emigration to Queensland; How to Settle on the Land in the Colony of Queensland. There is a map, on a scale of 1:1,710,720, which is compiled and lithographed from Official Maps.

COLONIAL.

[The Colonies.]—Colonial and Indian Exhibition, 1886.—Her Majesty's Colonies. A Series of Original Papers issued under the Authority of the Royal Commission. Compiled and edited by A. J. R. Trendell, C.M.G. With Introduction by J. R. Seeley, M.A. Second edition. London, Wm. Clowes & Sons, 1886: 8vo., pp. xxx. and 508. [Presented by Mr. Trendell.]

These notices of the colonies are issued in connection with the Colonial and Indian Exhibition, and include all the British Possessions except India. They are compiled from well-known sources, some of them being written by the Commissioners to the Exhibition. Naturally the condition of the colonies is represented in glowing terms, and the statements as to resources and capabilities should be accepted with caution, especially in the case of the Australian colonies. The book is useful as containing in a handy form sketches of the history and industrial condition of the colonies from a colonial point of view. Appended to each colony is a very slight sketch of its geography. There are some curious inaccuracies in the volume;—Spanish Town is not the seat of government in Jamaica.

Professor Seeley's introduction is full of interest, and is written on the same lines as his 'Expansion of England.' There are maps of several of the colonies, and Sir Rawson Rawson's Comparative Colonial Diagrams are prefixed.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Berlin.—Neuester illustrirter Plan von ——. Scale 1:17,777 or 4·1 inches to a geographical mile. Nebst alphabetische Verzeichniss der Strassen und Plätze. Berlin, S. Fischer, 1885. Price 1*s.* (*Dulau.*)

Carpathians.—Orohydrographical Map of the ——. 6 sheets. Scale 1:750,000 or 10·3 geographical miles to an inch. Military Geographical Institute, Vienna. Price 12*s.* (*Stanford.*)

Denmark.—Generalstabens topographiske Kaart over ——. Scale 1:40,000 or 1·8 inches to a geographical mile. Kalchographeret og graveret ved Generalstaben, Kjöbenhavn, 1885. Sheets:—Bjering, Udbyhöj, Glænstrup, Tjele. (*Dulau.*)

Deutschen Reiches.—Karte des ——, herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1886. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—153, Friedland in Mecklenburg. 216, Templin. 450, Ohlau. 451, Brieg. 498, Neustadt i. Schles. 531, Gerolzhofen. Price 1*s.* 6*d.* each sheet. (*Dulau.*)

Don et le Volga.—Carte du pays entre le ——, dressée par Léon Dru, d'après la carte de l'état-major de Russie et les documents recueillis par la mission en 1885 à l'échelle de 1:210,000 or 2·8 geographical miles to an inch. Paris, Erhard. (*Dulau.*)

Dresden.—Plan von ——, 1886. Scale 1:10,000 or 7·3 inches to a geographical mile. Bearbeitet vom Stadtvermessungsamte. Lith. Druck u. Verlag von C. C. Meinhold und Söhne in Dresden. (*Dulau.*)

Nord-Ostsee-Kanal.—Der ——. Zusammengestellt von C. J. Beseke. I. Kanalprojekte. II. Kanaltrace. III. Verschiebung der Nord-Ostsee-Fahrt. IV. Längenprofil des Kanals. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Taf. 4. Justus Perthes, Gotha. (*Dulau.*)

Rhöngebirges.—Karte des ——, und seiner nächsten Umgebungen. Herausgegeben vom Central-Ausschusse des Rhönclubs. Scale 1:150,000 or 2 geographical miles to an inch. Würzburg. Price 1*s.* 6*d.* (*Dulau.*)

Schweiz.—Karte der ——, nach dem Topographischen Atlasse der eidgenössischen Generalstabes. Reduziert unter der Direction des Herrn Generals G. H. Dufour. Scale: 1,000,000 or 13·6 geographical miles to an inch. Eidgenössisches Militair Archiv, Bern. Price 10*s.* 6*d.* (*Stanford.*)

—— Topographische Karte der ——, vermessen und herausgegeben auf Befehl der Eidgenössischen Behörden. Diese Karte, nach Flamsteeds modifizierter Projection entworfen, hat als Mittelpunkt die Sternwarte zu Bern, wurde aufgenommen und reduziert durch eidgenössische Ingenieure unter der Aufsicht des Generals G. H. Dufour. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Eidgenössisches Militair Archiv, Bern. Price 10*s.* 6*d.* (*Stanford.*)

These are very fine photographic reductions of two maps of Switzerland, compiled under direction of General G. H. Dufour; they are both on the same scale, but exhibit the effects of different shades of hill drawing. The results in both cases are very effective, all features being very clearly brought out, and with the aid of a glass the names of places can be read; though this does not improve the general effect of the maps, it nevertheless makes them more useful for reference.

Wideville et ses environs (Seine et Oise). Paris, Andriveau Goujon. (*Dulau.*)

88°
90°
Rajmahal
Hills
E R
24°
GANGES
G A L
DELTA
CALCUTTA
22°
Hooghly R.
MOUTHS OF THE GANGES
200
10°
Sq. Miles
45,000
330,000
120,000
97,000
21,400
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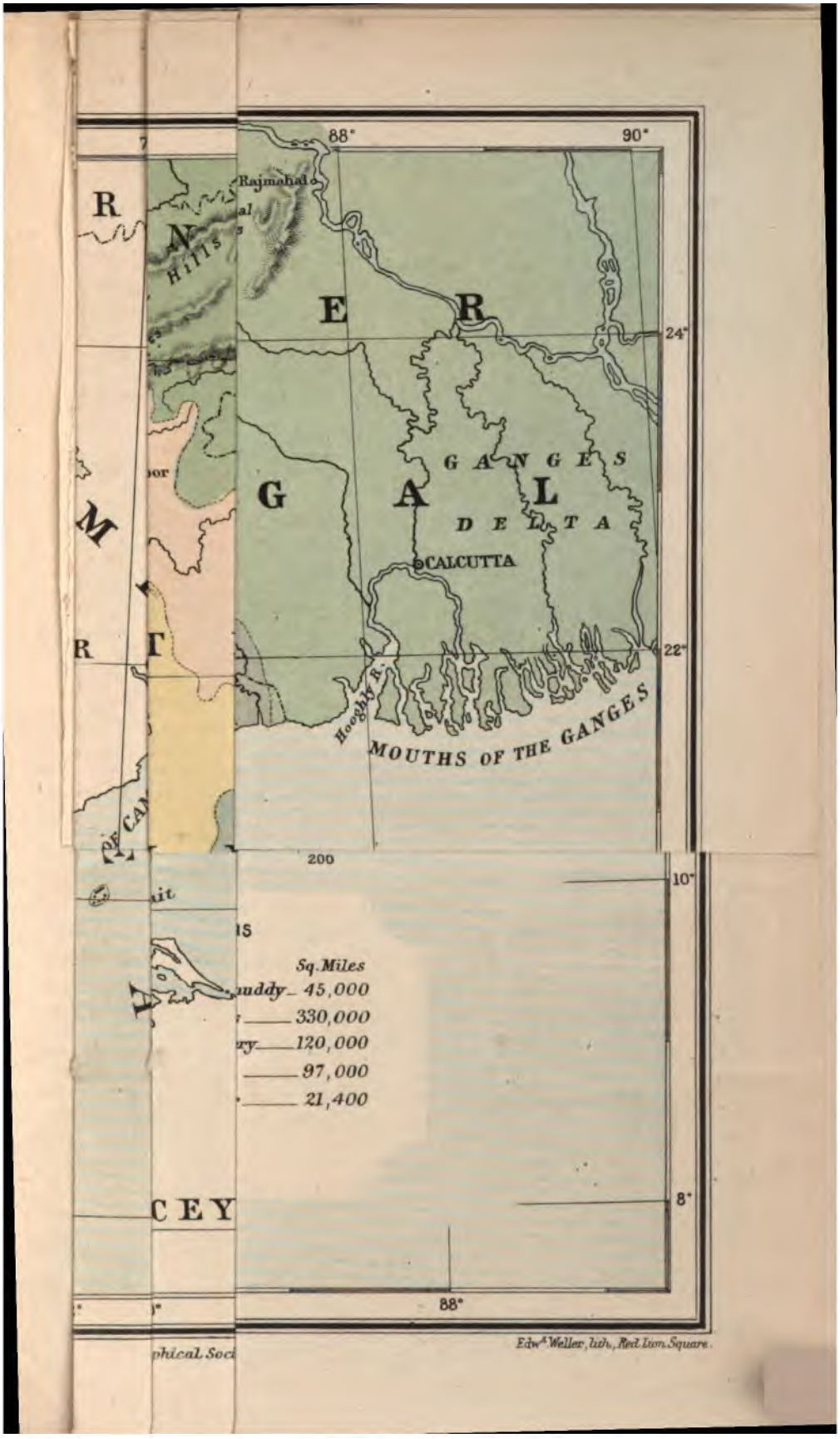
British Empire.—The —— on a uniform scale of 1 : 7,800,000 or 107 geographical miles to an inch. By William Shawe, F.R.G.S. London, G. Philip & Son. Price 14*s.*, on rollers, varnished.

This sheet of maps contains all the British possessions, drawn on a uniform scale, thus enabling the pupil to form some idea of the proportions which the different colonies bear to one another. In this he would be further assisted by the system of colouring. An example may be seen in Australia where the contrasts of colour show the small area of Victoria as compared with the other colonies. A table containing a continental summary of the British Empire, with reference to areas and populations is also given. The maps are drawn in a bold style, great pains have evidently been taken to bring it up to date, and it seems well adapted to the purpose for which it has been published.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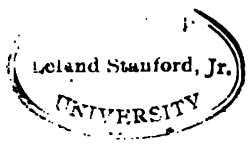
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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

On Similarities in the Physical Geography of the Great Oceans.

By J. Y. Buchanan.

(Read at the Evening Meeting, November 8th, 1886.)

Map and Diagrams, p. 808.

Oscar Peschel, in his charming work on New Problems of Comparative Geography, dilates on what had been called by Agassiz geographical homologies. He compared the study of the structure of the earth with that of the structure of the animal body, the science of geography with the science of anatomy. It is from studies of comparative anatomy that much of our knowledge of the early history and development of animals is derived, and it was hoped that analogous studies of land and sea would yield similar results. The establishment of geographical homologies having a certain amount of parallelism with anatomical homologies has been an important step in this direction. Thus, the wing of an eagle, the arm of a man, and the foreleg of a horse, are homologous features, that is, they are similar organs in corresponding positions. When we contemplate the features of the globe, we find the continental land of the world forming an almost continuous belt round the north pole, and separated from it by an area of chiefly sea. From this circumpolar belt the land stretches southwards, and appears to have a tendency to form three separate continental masses. Of these, the American continent is in all respects well defined, and stretches furthest in a southerly direction. The other two show their separate individuality in their southern portions, Africa and Australia; in their northern portions they are *twinned* (to use a mineralogical expression), forming the joint continent of Europe and Asia. Since ever maps have existed, the similarity in the form of the southern extremities of these continents has struck observers, and they are classed amongst remarkable geographical homologies. They are similar features in corresponding localities.

A remarkable group of similarities of this kind is to be found in the

arrangement of enclosed seas lying to the northward of the three southern continents. To the northward of South America there are the Gulf of Mexico and the different basins of the Caribbean Sea; to the northward of Africa there are the Mediterranean with its different basins, and on the north-east the Red Sea; and to the northward of Australia there are the well-known seas of the Eastern Archipelago. These seas are bounded on all sides by islands and insular groups, and they are in continuous connection with two oceans, the Pacific and the Indian. The African seas are bounded entirely by continental land and communicate directly with two oceans; but in the limited sense that one sea, the Red Sea, communicates with the Indian Ocean by a single channel, and the Mediterranean Seas with the Atlantic, likewise by a single channel. Finally, the American seas are all in continuous communication with only one ocean, the Atlantic, the continental barrier towards the Pacific being continuous.

It is not unworthy of remark that the great depths (over 4000 fathoms) of the Atlantic and the Pacific Oceans occur immediately to the northward of these groups of seas, and in the western sinus of the northern portions of both oceans; while the greatest depression of the continental land, the region of the Dead Sea, is found similarly situated with regard to Africa. The analogy here, however, does not hold good all through, because it is a mere accident of climate that this area does not form a large and not excessively deep fresh-water lake.

The enclosed seas just referred to lie on the margin of debatable ground between the continental and elevated area and the oceanic or depressed area of the earth's surface. The bed of the great ocean, including in this designation the great mass of water which surrounds the globe in its southern part and extends its important branches into the Pacific, the Indian, and the Atlantic oceans northwards, is necessarily a complementary feature in the earth's architecture as compared with the shape of the continental elevations. The one dovetails into the other. Again, in north polar regions we have a detached oceanic area, while in south polar regions we have a detached continental area. These are similarities of form, and have to do with the earth as a solid.

There is another class of similarities which are produced by climate reacting on the surface of the globe and producing certain alterations on it. We find similar alterations of this kind in corresponding localities.

It may be well in a sentence or two, to recall the characteristics of intertropical climate. As the belt between the tropics is the only region of the globe within which the sun is ever vertical, and it is always vertical over some part of it, it is the most highly heated part of the earth's surface. Acting on the air, the earth, and the water, the sun's heat renders them all specifically lighter, less dense. In the case of the air

and the water, the particles of which are mobile, it produces disturbances of equilibrium, which are adjusted by the movement of the particles producing in the air, winds, and in the sea, currents. Further, as the water is capable, under the influence of heat, of changing from the liquid to the aeriform state, there is a continual exchange going on between the water and the air, producing on the one hand, rain, and on the other, the less evident phenomenon of evaporation. All places on the same parallel of latitude are situated similarly with regard to the prime cause of climate, namely, radiation *from* the sun and *into* space. But the sensible effect of the sun's rays depends in a great measure on the nature of the substance they strike on. In passing through the atmosphere they hardly warm it at all; falling on the sea they warm the water moderately, and on the land they heat the ground intensely. Hence one reason why distribution of sea and land modifies climate. Another and secondary, but not less efficient cause is the obstruction offered by land masses to ocean currents, and in a modified way to winds. The effect of the sun's bestowing the greatest amount of heat in the equatorial region, is to produce the north-east and south-east trade winds which blow from higher latitudes towards the equator, suffering a deflection towards the west due to the changing peripheral velocity with changing latitude. Where these winds meet, there is the equatorial belt of calms and rains. The regularity of these conditions is disturbed by the fact above mentioned, that where we have land the sun's rays raise its surface to a higher temperature than in the case of their falling upon sea. The consequence of this is that the air draws in towards these highly heated areas, and modifies the primary trade wind, producing the secondary phenomenon of monsoons. As land predominates in the northern hemisphere and water in the southern, these phenomena are more evident in the northern than in the southern hemisphere, and they are particularly evident in the Indian Ocean. The trade winds during the whole of their course are travelling from regions of lower temperature to those of higher temperature; hence, even though they were saturated with moisture at the beginning, they would, as they continued their course and their temperature rose, increase their capacity for taking up moisture. Hence their great characteristic quality—they are *drying* winds.

The south-east trade wind passes chiefly over water, the north-east trade blows almost equally over land and over water. Its effects on land are principally visible in its progress over Western Asia and Africa. From Siberia to Morocco we have winds mainly from the north. Their actual direction is sometimes to the eastward, sometimes to the westward of north, according to the preponderance of local influences. They are of a highly drying character, and this is put clearly in evidence by the chain of inland drainage areas and absolute deserts which occupy this broad belt of continent. Thus we have the desert of Gobi, the inland

basins of the Aral and the Caspian, the salt lakes of Asia Minor, and the deserts of Arabia and North Africa.

The drying power of the wind is also shown by the fact that the Mediterranean, which lies in its course, but receives the drainage of quite half of Europe which lies in the rainy regions of the south-west winds, and that of a considerable portion of Equatorial Africa by the Nile, is essentially the receptacle of an inland drainage area, quite as much as the Caspian is.

In North America, from its configuration, the extent of country traversed by this wind is not so great as in the old continent, but still we have the well-known alkali deserts on the west side of the Rocky mountains. In the southern hemisphere we have an exactly similar phenomenon. The interior of Australia, except on the windward side, occupied by the colonies of Victoria, New South Wales, and Queensland, is a waterless desert; in South Africa we have the Kalahari desert; and in South America we have the rainless regions of the Argentine Republic and the Atacama desert. Here we have, then, a feature due to climate, which repeats itself in corresponding localities in the Old world and in the New, in the northern hemisphere and in the southern.

But the trade winds produce not only dry places on the land, but they produce also comparatively dry places on the sea. The areas of maximum density or salinity of the surface water are shown in the maps for the different oceans, and it will be seen that they are situated in localities corresponding with those of the deserts on land.

In concentrating the surface water in the regions over which the trade wind blows, it produces a powerful mechanical means of propagating the heat, obtained by the water at the surface from the sun, downwards into the colder depths below. All the year round, the water exposed to the influence of the trade wind is being energetically evaporated, while the rainfall in the same region is quite insignificant. The temperature of the surface varies with the season. When the temperature is rising, the water becomes specifically lighter, notwithstanding the concentration which is going on, and it has no tendency to leave the surface. When the temperature is falling, the water is still being concentrated at nearly the same rate, and the concentration and fall of temperature combine to render the water specifically heavier. It thus acquires the power of sinking through the water of same temperature but less saltness below it, and diffusing its higher temperature in the colder layers below. There is thus a diurnal and an annual oscillation which make the surface temperature felt at greater depths. The tendency is to propagate the lowest daily and the lowest annual temperature downwards, and the energy with which this takes place, depends on the excess of salinity of the surface waters over that of the waters beneath, and on the range of daily and especially annual temperature. The greater the range of salinity and of surface temperature, the greater will

be the oscillation produced, and the deeper will its effect be felt. Thus in the North Atlantic everything conspires to collect heat and propagate it downwards, and as a consequence, we find a higher temperature at 1000 fathoms off the coast of Europe than in any other part of the globe. In the North Pacific the range of density is deficient, and the subsurface water is comparatively cold.

In passing over the surface of the ocean, the winds not only remove water in the force of vapour, they also impart motion to the water immediately under their influence. The effect of this is to produce a general motion of the denser intertropical water towards the equator and towards the west, which is intensified near the equator and forms the well-known westerly equatorial current.

In the Atlantic the westerly running waters are collected in the western sinus of the ocean, and the head of water thus produced is relieved by the overflow of the Gulf Stream. In the Pacific the westerly running waters meet no continental obstacle, and pass freely into the eastern waters of the Indian Ocean, subject to a partial reversal during the season of the south-west monsoon. Everything conspires to produce an exaggerated heating effect in the waters of the western portion of an intertropical ocean. It is supplied with water which has already been heated further to the eastward, and this water, in virtue of its density, has the property of propagating the high temperature to greater depths. A secondary consequence of a leeward position in the ocean, due to this characteristic of such waters, is the presence of coral formations in the western regions of the Atlantic and Pacific, and, owing to the mixture of conditions, in both the eastern and western regions of the Indian Ocean.

Continental homologies, or similar features in corresponding localities, are found on the western as well as on the eastern sides of the continents. One of the most striking is the resemblance of the Gulf of Guinea on the African coast with the great Central American bight stretching from Cape St. Lucas at the extremity of the Californian Peninsula, by Panama, to the mouth of the Guayaquil river, and with the unnamed bight in the Indian Ocean bounded continentally by the north-west coast of Australia, and insularly by the chain of islands stretching from the Peninsula of Malacca to Australia. Oceanically these bights are homologous. It is in them that the beginnings of the westerly-running equatorial currents are to be found, and perhaps more important still, it is in them that the easterly-running counter equatorial currents end. They are to be found in each of the three oceans, and generally on the northward side of the axis of the westerly-running current. In the Atlantic the counter equatorial current is best known by its eastern portion, the Guinea current.

The observations here recorded of the Guinea current were made on board the steamship *Buccaneer*, at the invitation of the owners, the

Indiarubber, Guttapercha, and Telegraph Works Company, of Silvertown, and were carried out during a survey for a telegraph cable from Sierra Leone to St. Paul de Loanda. In order to render the results more intelligible, some of them have been extended in diagrammatic form. Diagram D shows the relation between the density of the water at the surface, and at 50 fathoms below it, to the distance off shore. The diagram begins on the 1st of January, when the ship had steamed over 200 miles out to sea from Conakry. Here the surface water, though differing from pure ocean water of the same latitude by its low density, is still the densest surface water met with in the period, the 1st to the 20th of January, embraced in the diagram. From this point the ship was run in shorewards, sounding frequently, and the parallelism of the density and the distance lines is very remarkable. As far as Cape Palmas it is so close that the distance from shore could almost be told from the density of the surface water. After rounding Cape Palmas, the density of the surface water shows itself less sensitive to the distance from shore, which may be due to the fact that, until near Accra, the route lay within the bight where there was little easterly current, but an occasional westerly eddy. To the westward of Cape Palmas the easterly current was very strong, especially inshore, where the water was comparatively fresh. It seemed then to strike across the bight, and was again found running very strong inshore between Cape Three Points and Cape St. Paul; but the density of the water was comparatively high, 1·0253. After rounding Cape St. Paul, the density of the water fell very much, and more markedly after leaving Porto Novo for S. Thomé.

The line of density at 50 fathoms is almost horizontal. The water at this depth is quite independent of surface influences. All through the Gulf of Guinea the water is found to have a maximum density at from 30 to 50 fathoms from the surface. Both at greater and at less depths the water is fresher. When the surface water is moving rapidly eastwards, at 50 fathoms it is either motionless or is moving in another direction.

For over 100 miles from Porto Novo, the surface water is that characteristic of the Guinea current, density about 1·024; at 150 miles, the density of the water rapidly falls, and for 200 miles the ship's course was through water of density below 1·022, indicating plainly the great influence of the neighbouring river Niger. The ship's course here was almost exactly parallel to the western coast-line of the Niger delta, and the very fresh water ceased when the coast-line took an easterly trend at the Nun entrance of the river. This belt of fresh water, 200 miles broad, teemed with diatoms.

The density of the surface water as far as the island of S. Thomé remained moderately uniform at about 1·023. About 100 miles south of S. Thomé the surface density rose rapidly to over 1·025 off Cape Lopez,

and 100 miles further south it fell below 1·022 off the mouth of the river Ogowé. Between this and the mouth of the Congo the surface water rises in density to above 1·026. Off the mouth of the Congo the fresh water was again met with, a stretch of over 200 miles on our line having water of under 1·022 density. South of the Congo and as far as Loanda the surface density rises above 1·026 and is oceanic and free from river influences.

On this line of section the part south of S. Thomé is occupied by ocean water, with river water superposed in places; the part north of the islands has a layer of intermediate Guinea current water interposed between the underlying ocean water and the overlying Niger water. Along this line the dependence of the temperature of the subsurface layers on the distribution of salinity in the water was evident. North of the island of S. Thomé we have large areas of river water on the surface with comparatively fresh Guinea current water below. South of that island the supply of river water is probably quite as large, but it lies on the ocean water of temperate tropical regions with a high surface salinity. While, therefore, we find the actual surface temperature higher to the northward of S. Thomé, the subsurface water is warmer to the southward of it. North of S. Thomé, a temperature of 65° F. is found at an average depth of about 35 fathoms; south of that island it is found as deep as 60 fathoms at a station where the density (at 60° F.) of the water from the surface downwards was over 1·026. After passing the mouth of the Congo, equatorial features disappear, and at a station near St. Paul de Loanda, the cold deep water was found approaching the surface, a temperature of 65° F. being found at 15 fathoms. Here we find the beginning of the cold water of the windward shore of the South Atlantic.

Diagram C is a meridional section on long. 14° W. down to a depth of 200 fathoms, compiled from observations on board the *Buccaneer* in March 1886, and the *Challenger* in April 1876. The range is from 11° N. to 12° S. From 9° N. to 11° S. the temperature of the surface is above 80° F., and the isothermal of 80° travels at depths varying from 10 to 25 fathoms. From 10° N. to 4° S. the isotherm of 70° maintains a nearly constant level of 25 to 30 fathoms; to the southward of 4° S. it dips deeper. The isotherm of 65° follows a nearly parallel course. That of 60° comes within 30 fathoms of surface at 4° S., and dips rapidly towards the south, more gently towards the north.

This diagram shows well the distinguishing features of an equatorial ocean in the warm season of the year. In the cooler season the surface temperature is below 80°, and the temperature gradients in the layers near the surface are gentler. At this season, with the sun nearly vertical over the equator, and a thick layer of water of temperature over 80° F. on the surface, the gradients are very steep. This was found both by the *Challenger* and the *Buccaneer*, in which ship several of the

Challenger's temperature stations were repeated. Thus station 43 of *Buccaneer* was made on 7th March, 1886, in the same position as No. 346 of *Challenger* on 6th April, 1876, namely, lat. 2° 42′ S., long. 14° 43′ W. The *Challenger* found a higher surface temperature, 82·7° against 81·7°; but the layer of water above 80° F. was thicker in March 1886 than in April 1876. The following temperatures were observed:—

	Depth.	Surface.	10.	20.	25.	30.	50.	
Temp.	*Challenger*	82·7°	82·0°	78·1°	71·5°	62·2°	56·5	F.
	Buccaneer	81·7°	81·2°	81·0°	65·2°	61·8°	57·3	„

It is remarkable that the *Buccaneer* found a fall of 16° F. in 5 fathoms between 20 and 25 fathoms; the steepest gradient found by the *Challenger* was about 9·3° in 5 fathoms between 25 and 30 fathoms. Similar gradients and even steeper ones are found in our fresh-water lakes about midsummer, when the surface heating is proceeding most rapidly. In July of this year (1886) a fall of 5° in *one* fathom was observed in Loch Lomond at a depth of 12 fathoms. In the diagram the red lines are those of equal density at constant temperature (60° F.). The line of 1·027 shows the penetration of dense trade-wind water, and the effect of high surface density in facilitating the propagation of heat downwards is well shown by the dipping of the isotherms. The surface outcrops of the 1·026 line to the north of the line indicate the average position of the equatorial freshet. On this line neither the *Challenger* nor the *Buccaneer* experienced any sensible easterly current, and it is well known that the Guinea current experiences marked variations with the season.

In the *Buccaneer* it was the custom every day at 1 P.M. to throw overboard a bottle containing a note of the position and a request to the finder that the paper might be sent home with a record of the time and place of discovery. Up to the present date four of these bottles have been reported as found. Two of these, A and B, were thrown overboard off the Kroo coast; A on the 6th January, in lat. 6° 40′ N., long. 12° 32′ W., a distance of 42 miles from the coast; and B on the 8th January, in 4° 49′ N., 9° 38′ W., a distance of 30 miles off the coast. A was picked up by a native who watched it coming ashore in the breakers, in lat. 5° 47′ N., long. 0° 35′ E., about 10 miles from Addah, on 5th March. B was picked up on Bey Beach in lat. 6° 8′ N., long. 1° 17′ E., about 40 miles further east than A, on the 2nd March. A had thus travelled 862 miles in 58 days, the average rate per day being 15 miles, and B had travelled 690 miles in 53 days at an average rate of 13 miles per day. They were washed ashore, one on one side and the other on the other side of Cape St. Paul where the tide-rips and discoloured water show the meeting of different current systems.

The change in the character of the current at different times is shown by the fact that in travelling north from the equator towards Sierra

Leone in March, the *Buccaneer* experienced no easterly current, and a bottle thrown overboard on this passage was washed ashore on the Kroo coast, whereas if the same current had prevailed in both March and January the bottle would have been carried round Cape Palmas and into the Gulf of Guinea. In connection with the absence of easterly currents off the coast may be taken the very remarkable under-current which is found setting in a south-easterly direction with a velocity of over a mile per hour at three stations almost on the equator, and to the northward of the Island of Ascension. For the double purpose of examining the currents and of obtaining a large specimen of the bottom, the *Buccaneer* was anchored in 1800 fathoms of water by means of an ordinary light anchor fitted with a canvas bag to receive the mud which would otherwise fall off the flukes on its being weighed. While the ship was lying thus at anchor, the surface water was found to have a very slight westerly set. At a depth of 15 fathoms there was a difference, and at 30 fathoms the water was running so strongly to the south-east that it was impossible to make observations of temperature, as the lines, heavily loaded, drifted straight out, and could not be sunk by any weight the strain of which they could bear.

In the Pacific the counter equatorial current in the open ocean was well observed by the *Challenger* on her voyage from Hawaii to Tahiti. Her observations are represented in Diagrams A and B. A gives the surface current in miles per day along a mean meridian of 150° W., easterly current being laid off above, and westerly current below, the meridian line, along which degrees of latitude are measured. B represents the distribution of *true density*, that is, the density of the water due to its salinity and temperature combined, but at constant pressure, in the water from the surface to a depth of 200 fathoms. As these lines of equal density coincide nearly with corresponding isothermal lines, the approximately corresponding isothermals are indicated in the diagrams. The red lines intruding unconformably into the diagram represent density at constant temperature (60° F.), which is proportional to salinity. The horizontal scale of degrees of latitude is the same for both diagrams. The current diagram is carried to lat. 7° S., while the density diagram stops at 3° 48′ S. The easterly current was found between the parallels of 5° and 10° N., there being two streaks of *maximum* velocity, one between 7° and 8° N., and the other between 9° and 10°. In the former the mean daily set was 54 miles; in the latter it was probably quite as high, but it could not be accurately determined, as the ship passed from westerly to easterly current in the course of the 24 hours, and the observed current of 20 miles represented the difference of the two. The streaks or axes of strong easterly current are sharply defined by areas of abnormally low surface density. The whole of the area of easterly running water has a comparatively low density, but where there is a sudden acceleration of its velocity there is a correspondingly sudden

drop in its density, so that the existence of a strong easterly current in equatorial regions may be guessed with great probability by the use of the hydrometer. Thus, in the region of general easterly current, the specific gravity (at 60° F.) of the surface ranged between 1·0255 and 1·0258, but where the current was strongest it fell to 1·0249 in lat. 9° 28′, and 1·02475 in lat. 7° 26′ N. It rose rapidly immediately the westerly running water was reached, being 1·02621 in lat. 2° 34′ N.

The diagram shows also in a very marked way the protective action of the fresh surface water in preventing the penetration of heat into the lower layers of the water. A temperature of 60° F. is found here (lat. 9° 10′ N.) at a depth of 50 fathoms from the surface, while in the westerly running current, a little further south (lat. 2° 34′ N.), the same temperature occurs at a depth of over 100 fathoms. The effect is even more striking if the mean temperature of corresponding layers is compared as in the following table. Besides stations 267 and 270, the figures for station 278, in lat. 17° 12′ S., with the island of Tahiti in sight are given. No current was logged here, but the effect of high surface salinity, gradually falling as the depth increases, in propagating heat downwards, is made particularly evident.

Mean Temperature of Different Layers of Water.

No. of Station (*Challenger*).	Latitude.	Current in 24 hours.	Mean Temperature Fahr. of Water between			
			Surface and 20 fathoms.	20 and 80 fathoms.	80 and 150 fathoms.	Surface and 150 fathoms.
278	17° 12′ S.	none logged	78°·2	76°·3	70°·1	73°·8
270	2° 34′ N.	W. 70′	78·5	75·9	59·8	68·7
267	9° 28′ N.	E. 19′	77·3	58·9	50·4	57·4
Difference		270–267	1·2	17·0	9·4	11·3
		278–270	−0·3	+0·4	10·3	5·3
		278–267	+0·9	17·4	19·7	16·6

Observed Density (at 60° F.) of Water at Different Depths at the Same Stations.

No. of Station.	Density at 60° F. of Water at				
	Surface.	25 fathoms.	50 fathoms.	100 fathoms.	200 fathoms.
278	1·02696	1·02694	1·02697	1·02678	1·02593
270	1·02621	1·02591	1·02572	1·02567	1·02572
267	1·02490	1·02552	1·02552	1·02578	1·02567

If the figures in these tables be studied, it will be seen that the temperature follows the density, that is, the further the high density penetrates the deeper do we find a high temperature. At station 278 the high surface density is found to persist almost undiminished down to

100 fathoms, while at No. 270 it does not persist much beyond 25 fathoms. Accordingly, at 278 we find a mean temperature between 80 and 150 fathoms, 10·3° higher than at 270. From the surface to 80 fathoms there is very little difference in the amount of heat in the water. Besides a greater range of salinity in the water of different layers at station 278 than at station 270, there is certain to be a greater annual range of surface temperature at lat. 17° S. than at lat. 2° N., and this will also be helpful in propagating heat downwards. Further, at the equatorial station the concentrated surface water is being hurried away westwards at a rate of 70 miles in 24 hours, while at lat. 17° S. it was not found to have any very apparent motion. At station No. 267 there is a layer of very low salinity, of probably not more than 20 fathoms in thickness, yet this so completely screens the water below, that the temperature of the layer between 20 and 80 fathoms is 17° lower than at the neighbouring station No. 270. The surface water at both stations is moving away rapidly, and the deeper and colder water, which rises to supply a portion of the deficiency, cools the surface water at both stations; but at station 267, however much the surface water be cooled, it still floats on the surface, while at No. 270, on being cooled to the same temperature as the water immediately below it, it sinks through it, carrying this temperature deeper.

The study of the currents of equatorial regions would well repay the trouble of the investigation. The counter equatorial current is particularly interesting, and its dynamics obscure. Its range is very superficial, and its physical conditions can be studied without the elaborate and costly equipment required for the research of oceanic depths.

With the change of season the counter equatorial current shifts its latitude, but within narrow limits. It seems never to be met with south of the equator and rarely south of lat. 4° N. Its extreme fluctuations are between 4° N. and 12° N., and for the greater part of the year it occupies the zone between 7° and 9° N. where it has impressed its mark on the distribution of temperature in the water below it. In Diagram B, where the lines of *true density* coincide closely with the isothermal lines, we see the isothermal of 50 (coinciding with 1·027) approach within 110 fathoms of the surface at the station in lat. 9° 28′, and it falls away to below 200 fathoms on both sides. The vermilion line passing unconformably through the above shows the extent to which the concentrated waters of the south-east trade wind district penetrate. To the left hand or north of this line all the water is at a density (at 60° F.) below 1·026. The water is diluted both by diffusion of the rain water above and the rising of abysmal water from below without mixture with any concentrated surface water.

In the Western Pacific on the voyage from Admiralty Island to Japan in March, the *Challenger* passed through no similar easterly current, but here it is probably completely checked by the strength of the

north-east monsoon and may be much intensified at the other seasons by the south-east monsoon.

The temperature observations showed the enormous amount of highly heated comparatively dense water flowing at this season steadily westward towards the Indian Ocean. In its progress from the meridian of 150° W. to that of 145° E. the westerly stream has taken up an enormous amount of heat. The velocity of the western current is not so great, but its axis lies in the same latitude, namely between 2° and 3° N. The surface temperature is over 83° F., and at 90 fathoms the temperature of the water is still above 80°. Between these depths the water has on an average a temperature about 5° higher at the western than at the central station. The mean temperature of the layer between the surface and 140 fathoms, where the temperature curves cut each other, is 69·8° at the central station, and 77·5 at the western. The current logged at the western station was 30 miles, while it was 70 miles at the central one.

To the north and to the south of the equatorial bights of the western shores of Africa and America we have a remarkable similarity in the distribution of temperature in the coast waters. The transition from equatorial heat to extratropical cold is very marked; on the North American shore, at Cape St. Lucas, the southern extremity of the Californian peninsula; on the North African, at Cape Verd; on the South American shore, at Cape Blanco; and on the South African, at Cape Frio. These areas are coloured green on the map. The very low temperature of the coast water is particularly remarkable on the Morocco coast, and it extends round Cape Spartel into the Straits of Gibraltar. Here the temperature of the surface water is usually 10° F. lower than on the European side of the Straits. Similarly, off Mogador the temperature of the surface water inshore is 60° F., while it is 70° F. 20 miles out at sea. The delightful climate of Tangiers and the low temperature of Mogador, are directly due to the existence of this water on the shore. The same comparatively cool water is found all the way down the African coast as far as Cape Verd.

On the west coast of South Africa there is not much experience of sea-water temperatures, but the characteristics of the climate on shore, are a low temperature, much cloud and mist, no rain, and barren waterless country. On the Atlantic side of the Cape of Good Hope the surface water inshore has a temperature about 10° F. lower than the water on the Indian Ocean side of the Cape, and all the way northwards as far as St. Paul de Loanda the barrenness of the land is more than compensated by the fruitfulness of the sea, which everywhere abounds with fish, indicating cold water.

The abnormally cold water found on the west coast of South America has been well known since the beginning of the century, principally by the works of Humboldt. In the months of April and May of 1885, I

made the voyage along the coast, from Valparaiso to San Francisco, and carefully observed the temperature and density of the surface water several times a day.

My voyage being made in the months of April and May, the season was autumn in the southern hemisphere, and spring in the northern. The water ought therefore to have been about its highest temperature during the cruise along the coast of South America. As on the coast of Morocco, it was observed that the lowest temperature was always found closest inshore, also that the cold inshore water was green, while 10 or 15 miles out it was warm, and of the deep ultramarine peculiar to tropical ocean water. From Coquimbo to Pisagua the temperature averaged 60° F., being as low as 57° just outside Coquimbo, and being actually 60° F. in Pisagua anchorage, in lat. 19° 30′ S. At Arica it was 67° F., and crossing the bight, where the course lay in open water, the temperature rose to 73°, but fell again on closing the shore, being as low as 59·5° when 5 miles off Independencia Bay, in lat. 14° S. Further along the coast it averaged about 61°, and in Payta anchorage, in lat. 5° S., it was 63·5° F., though the heat on shore was intolerable. On leaving Payta the ship rounded Cape Blanco, and in a distance of 35 miles, during the night, the temperature rose from 65° to 75°. In rounding Cape Blanco the ship had entered equatorial waters. The characteristics of the South American coast waters were similar to those of the Morocco coast—the water cool, and the land desert. There is no stream or current sufficient to affect the passages of ships to the southward of Cape Blanco. Northward of Cape Blanco currents are met with running sometimes in one direction, and sometimes in another.

From the Guayaquil river the ship left the coast and steamed straight to Panama, and the surface temperature varied from 75° to 80° F., which, for equatorial water, is comparatively cool. The climate of Panama is remarkable. From January to May the temperature of the water is much lower than that of the air. Mr. Ward, first officer of the s.s. *Colima*, in which I made the passage from Panama to San Francisco, kept very careful meteorological logs, and I am indebted to him for much information about the coast, which he kindly communicated to me. At the end of February 1885 the mean (of four days) temperature, at midnight, of the air was 77° F. and of the water 75·5, and at noon that of the air was 83·2° and of the water 74·8°, so that at noon the temperature of the water was 8·4° lower than that of the air. At other seasons of the year the warm counter equatorial water extends southward of Panama and communicates to it the same oppressive climate to be found further north along the coast of Central America. From Panama as far as Cape Corrientes the temperature of the surface water was above 80° F., and nearly always above 84° F., at times as high as 88° and 89° F. It gradually declined after rounding the cape to 77·4° when anchoring at Mazatlan. On getting under way in the afternoon the

temperature of the surface water was 75·8°, and the cold water must have come very close to the surface, for water taken from the wash when the ship was going astern had a temperature of 72·8°. All the way across the mouth of the Gulf of California the water was very constantly at a temperature of 78° F., with a deep ultramarine colour. Both these characteristics began to change as the mountainous coast of Lower California was approached. At 2 p.m. the temperature fell to 75·8°, but recovered again to 77·0° at 4 p.m., when the ship was less than two miles off shore, and to the eastward of Cape St. Lucas. The change now became very evident to the senses, and at 4.35 p.m., after the rocky promontory had been passed, the temperature was 73·4°, and at 5.45 p.m., while still close inshore, the temperature of the water had fallen to 64·4°, and its colour was quite green. On leaving the shore the temperature rose to 66·8°, and next morning at 8 a.m. it had fallen to 59°, when about two miles off Marguarete Island. The number of sharks off Cape St. Lucas, and indeed far out into the mouth of the gulf, was quite extraordinary. Quantities of large fish with the glistening scales of salmon were jumping in the water close to the shore round Cape St. Lucas. The temperature of the water remained constantly at about 60° F. until, after passing Santa Barbara, the ship rounds Cape Concepcion, when the temperature fell to 52° F. It was 50° at the entrance of San Francisco harbour.

These sharp transitions are found only close inshore, and they have usually been attributed to surface currents from higher latitudes. This explanation is at variance with the observations of navigators on the coasts, who do not notice any currents which would be strong enough to bring water many hundreds of miles under a burning sun without sensible rise in temperature. The occurrence of these coast areas of abnormally cold water is explained when we recognise that they are the windward shores of the oceans. The trade winds blow from them towards the equator, and in doing so mechanically remove water, which has to be supplied from the readiest source. This source is the deep water lying off the continental coast, which is supplied by a gradual drift of cold water from high latitudes. Hence, though the low temperature of the coast waters referred to is due to the cold of high latitudes, it is not supplied by a long surface current, but by a short vertical one. This view is very strongly supported not only by the temperature of the water, but by its other characteristics, especially colour. The outside ocean water is of an intense ultramarine blue; the coast water off Mogador had the clear olive-green colour met with constantly in Antarctic seas. The same is observed on the west coast of North and South America, and it would be of the highest interest to have these waters investigated from a biological point of view. No waters in the ocean so teem with life as those on the west coast of South America. A bucket of water collected over the side is turbid with living organisms, the food of countless shoals

of fish, who, in their turn, afford prey for innumerable schools of porpoises. One remarkable school which accompanied the ship for some time consisted entirely of females, each accompanied by a calf following in her wake and mimicking her every movement. Along with abundance of life this coast unites facilities for investigating it. At every port there are plenty of shore boats anxious for a fare, and with a tow net and a few bottles a naturalist might make a rich collection of the shore-water fauna of the coast in one trip from Valparaiso to Panama.

The characteristics of inshore water of the windward coasts of the oceans are, an abnormally low temperature, usually a comparatively low density, and always a pronounced and peculiar green colour. These characteristics are found most marked in the water between the shore and the 100 fathom line. The water, as it drifts out to sea, rapidly loses its low temperature, and its green colour is bleached. In the year 1883 when, through the kindness of the Silvertown Company, I had the opportunity of carrying out some researches in their ship *Dacia*, I dredged a number of shells from the Dacia Bank, lying between Teneriffe and Madeira. These shells were all stained with a green colour, which came out and coloured the spirit in which they were preserved. I submitted this coloured spirit to my friend Professor Hartley, of Dublin, and he determined the colouring matter to be a species of chlorophyll. Some of the coloured spirit of the *Challenger* collection was then sent by Mr. Murray, with the result that Professor Hartley detected chlorophyll in it also. The diatoms so abundant in the surface waters of Antarctic regions, give the water and the ice exactly the colour which is to be found in the coast waters of windward shores. It would be a matter of great interest to determine, by careful observations and investigation, if the green colour of these coast waters is directly or indirectly due to the presence of chlorophyll.

A most remarkable confirmation of the view that the cold water on the windward shores is due to a submarine source, has been quite recently supplied by the observations of Captain Hoffmann of the German man-of-war *Möwe*, on a voyage from Zanzibar to Aden. Zanzibar was left on 28th June, 1886, Cape Gardafui was passed on 5th July, and Aden reached on 11th July, 1886. The season was therefore that of the strongest south-east trade wind in the southern part and of the south-west monsoon in the northern part of the Indian Ocean. Captain Hoffmann kept as close to the coast as possible, chiefly with a view of checking and correcting the sailing direction for this little-frequented coast, but also in order to test the view which he held that the inshore passage at this season was not so risky as was commonly held. He found this view completely justified, both wind and sea being much less and more uniform. The daily epitome of weather during the few days spent on this coast was—sea-breeze from midday to midnight, fresh enough to enable progress to be made under steam and sail, then a light

land breeze till 8 a.m., and in the forenoon calm. The sea breeze would be a fair wind for the *Möwe*, and its lightness may be gauged by the fact that the sails alone were not thought sufficient for making passage, especially when assisted by the very strong northerly current. On one day 240 miles were made good, although the highest speed logged was only 6·5 knots. This gives an average of 3·5 knots per hour in the twenty-four hours; and, as all these currents are affected by tidal influences, its maximum speed may have been much greater. Captain Hoffmann says:—"At Cape Warschek (lat. 2° 30′ N.) strong cross currents were observed, and it seemed that the along-shore current here swept out to sea. The remarkable change in temperature which here commences seems to be connected with the change of current. Up to this point the temperature both of air and water had remained sensibly the same (77° F.) as at Zanzibar. As soon as the strong current had ceased, the temperature of the water fell rapidly between the parallels of 4° N. and 8° N., and attained at Ras al Khyle the abnormally low minimum of 59° F. As a consequence of this the temperature of the air fell. With a clear sky the thermometer did not rise at midday above 68° F., so that exposure to the direct sun was in no way disagreeable. The horizon was hazy, and at night there was heavy dew. The sea had a deep olive-green, often almost black, appearance; close to the coast it was clear green. In the seas of normal temperature the colour of the water was always deep blue. In every other region of the sea one would conclude from these observations that there was here a polar stream. Here it will be impossible to avoid admitting a rising of the water from greater depths. It is proved thus, in the great depths of the ocean here, as well as in other regions, the water is cooled down to near the freezing point."

We have seen that the season when Captain Hoffmann passed along this coast was that of the south-west monsoon, and at this season the Somali coast is a pronounced windward shore, and exhibits the same characteristics as the corresponding coasts of Morocco and western South America.

Before the reading of the above the PRESIDENT said,

The paper to be read was by Mr. Buchanan, who would give the results, some of them of much interest and originality, of his deep-sea explorations. Mr. Buchanan had the right to speak with authority on this important department of physical geography, for he was a member of the scientific staff of the *Challenger* in the now famous voyage round the world of that vessel, and he has since added to his experience by accompanying, as a volunteer, the *Buccaneer*, a vessel belonging to the Silvertown Company, on its voyage to the Gulf of Guinea, undertaken for the purpose of sounding and dredging the sea-bottom, preparatory to the laying of the West African cable.

After the paper,

Admiral Sir ERASMUS OMMANNEY said that oceanography would now take a prominent place among the sciences which investigated the conditions of the surface of the globe. He would not criticise the reasonings and conclusions which the

lecturer had brought before the meeting, but he wished to ask one question with regard to the influence of evaporation on the surface. Mr. Buchanan had shown very clearly what the result was of the drift of the winds, but he had omitted to show what was the result of evaporation. The Society was very much indebted to him for the investigations that he had made. He was one of those gentlemen who took a very prominent part in the scientific observations during the *Challenger* trip, which showed to a small extent what was going on in the depth of the ocean and awakened a desire that similar expeditions might be carried out at a future day. At the present time very little was known of what was going on in the Southern Ocean in the higher latitudes above 50°, and within the Antarctic zone.

Mr. BUCHANAN, in answer, said that evaporation undoubtedly produced cold, and he had made a number of experiments in connection with that matter. The conclusion he arrived at was that the effect of the evaporation was greater upon the air above the water than upon the water itself, because the water was rapidly warmed by the sun. The consequence was rather remarkable. Normally the air above the ocean was cooler than the water below it, and where it was found that the water was warmer than the air a normal state of things might exist; but on the other hand, if it was found that the water was colder than the air, it might be inferred that that water came from another region.

Admiral Sir LEOPOLD M'CLINTOCK said he was surprised at one observation which Mr. Buchanan had made, namely, that coral could not live at a temperature below 68°, because he knew that coral was abundant at Bermuda which was 10° north of the tropics. He wished to ask Mr. Buchanan what was the lowest depth at which the coral insect worked. He had always understood that the temperature of water at its maximum density was about 39°, but Mr. Buchanan had stated that the temperature fell below that. He would therefore ask what was the lowest temperature with which Mr. Buchanan was acquainted.

Mr. BUCHANAN replying to Sir Leopold, said the maximum density of distilled water was 39°, but of sea water below 28° Fahr., and in high southern latitudes the freezing point of salt water was 28°. With regard to the coral question, Bermuda was in a very warm area. In that part of the Atlantic the warm water attained a very great depth. There were corals and corals. Those which he referred to formed atolls and reefs; his belief was that they did not live in water of a lower temperature than 68°, but there were plenty of deep sea corals which lived in an ice-cold temperature, and in one of his expeditions he examined a remarkable shoal of deep sea corals, at 500 fathoms, in water of 50°. In course of time that no doubt would come to the surface, and if it met with warm water, which he did not think it would, it would give rise to a coral island. That was the way in which many coral islands were formed.

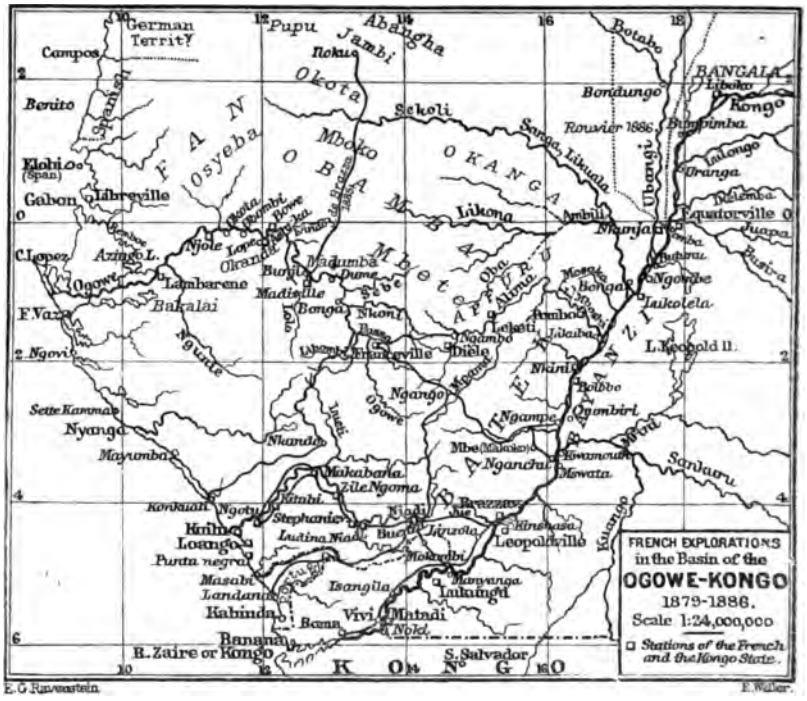
Dr. RAE said that Mr. Leigh Smith found warm water underneath the cold, and that was easily accounted for. The Gulf Stream was much salter than the Arctic water, and when it got cooled down to a greater density it met the water from the Arctic, which from the thawing of the snow and ice was very fresh on the surface. As soon as the Gulf Stream water met it, being heavier than the Arctic water, it dipped down. Both Leigh Smith and Parry found a stratum of water warmer than that on the surface at a considerable depth near Spitzbergen. Another curious thing was that Payer, when he discovered Franz-Josef Land, found very early in the season an open sea in a narrow strait abounding with water-fowl. His impression was that that strait was kept open because there was a shallow part with deep waters at each end, and the warm waters ascending from below kept the surface from freezing. On the other side, towards Davis Straits, those who had taken soundings had found no such current. The Gulf Stream did not extend in that direction.

The PRESIDENT, in proposing a vote of thanks to Mr. Buchanan, said that the long and careful study he had given to the subject entitled him to their heartiest acknowledgments. He had shown the great analogy between the forces which operate on the sea and those which operate on land. He (the President) felt himself quite incapable of making any observations on a subject which was so new, but he was sure that Mr. Buchanan must have been highly gratified by the commendation passed upon his paper by two such authorities as Sir Erasmus Ommanney and Sir Leopold M'Clintock. He hoped that the Society might have another opportunity of hearing Mr. Buchanan on this interesting subject.

Recent French Explorations in the Ogowe-Congo Region.

By Major R. DE LANNOY DE BISSY.

ALL the explorations in this part of Africa are of comparatively recent date. It is hardly thirty years since Du Chaillu revealed the extent of the basin of the Ogowe; twenty-four since Genoyer and Serval crossed by land from the basin of the



Gabon into that of the Ogowe; thirteen since Walker ascended the Ogowe to Lope. Compiègne and Marche only advanced as far as the Ivindo in 1874, whilst the expedition of Pierre de Brazza and Dr. Ballay, which defined the basin of the Ogowe

and led to the discovery of the Alima and Likona, only terminated in November 1878. Lastly, the glorious discovery of the whole course of the Congo, by Stanley, was accomplished as recently as 1877.

Putting these earlier exploratory journeys behind us, we propose on the present occasion merely to deal with those expeditions which have taken place since 1878, that is to say, with the last two journeys of De Brazza and with those of Dr. Ballay, Lieut. Mizon, and Captain Rouvier, these being the more important from a geographical point of view.

Pierre de Brazza's Second Journey, 1879–82.

During his first expedition De Brazza, jointly with Dr. Ballay, had discovered a direct route leading from the Gabon along the Ogowe and Alima, to the Congo. His second expedition had for its object the extension of French influence in the countries recently discovered, and the establishment of two stations, one on the Upper Ogowe, the other on the banks of the Congo.

He accomplished his task very rapidly, for six months after his departure from Europe, which had taken place on December 27th, 1879, he was able to announce that his first station had been founded at Ngimi near the confluence of the Ogowe with the Passa; and that having made a treaty with Makoko, the ruler of the Bateke, in September 1880, he was able soon afterwards to found his second station at Ntamo-Nkuno (Stanley Pool). He then descended the Congo by the right bank, met Stanley at Vivi, and was back at the Gabon on December 16th.

His task might have been looked upon as accomplished had not circumstances delayed the departure of Dr. Ballay, who had been intrusted with the conveyance of a steam-launch to the Alima, and of Lieut. Mizon, who was to take charge of the stations founded by De Brazza.

When De Brazza arrived at the Gabon, Dr. Ballay had not yet made his appearance. De Brazza, anxious about the men whom he had left behind him far in the interior, started once more from Libreville only twenty-four hours after he had arrived there. The enforced leisure which he enjoyed at Nghimi (since known as Franceville) was employed in victualling his posts, in opening up a carriage road to the Alima, and in organising the transport along the Ogowe.

The arrival of Lieut. Mizon at Ngimi on September 22nd, 1881, set him free. He then undertook to discover a practicable route connecting Ntamo (Stanley Pool) with the Atlantic. On this errand bent he arrived at the Niadi (or Upper Kuilu) on March 9th, 1882, and at once made up his mind that this river presented the sought-for facilities. He therefore searched for a convenient branch-route connecting the Niadi with the Congo at Vivi. Unfortunately, just when on the point of discovering such a route, he was attacked in a Bakamba village, and compelled to travel by the most direct route to Landana, where he arrived on April 17th, 1882. He immediately returned to France.

The scientific results of this expedition were of considerable importance. The watershed between the Congo and the Ogowe had been determined; the course of the Congo between lat. 3° S. and Stanley Pool, up till then only known through the rapid passage of Stanley, had been laid down more correctly, Stanley Pool itself being shifted 80 miles to the westward; and lastly, the valleys of the Niadi and Jue were ascertained to present facilities for the construction of a railway connecting Ntamo-Nkuna with the Atlantic. De Brazza moreover furnished some geological notes on the region inhabited by the Babwende and the Basundi, and collected a mass of information on the various tribes, their numbers, customs, aptitudes and interests. He laid down his routes by numerous astronomical observations, and

determined a large number of altitudes. Among others he determined the latitudes of the following places:—

	° ′ ″		° ′ ″
Ngantalli	2 59 0 S.	Ngiri	3 54 0 S.
Okoto Buali	3 6 28 „	Minga	4 30 45 „
Nkane	3 11 0 „	Mezu-Manioko ..	4 35 40 „
Nboto	3 17 28 „	Mukasu	4 4 44 „
Makaka	3 29 30 „		

De Brazza's Third Expedition, 1883–85.

The success with which De Brazza had accomplished his second mission led to his return to the Ogowe, a year afterwards, as "Government Commissioner." He embarked on March 19th, 1883, with a numerous staff, carrying with him the treaty he had made with the Makoko in 1880, and which the French Chambers had ratified on November 21st, 1882.

Liberally supplied with stores and merchandise, and enjoying moreover the assistance of several devoted followers, De Brazza was enabled to carry out his instructions successfully, not only by extending geographical explorations and securing the routes connecting the Ogowe and Congo by a chain of posts, but also by taking possession of several desirable territories in the kingdom of Loango and in the basin of the Kuilu.

On April 22nd he landed at Libreville. A week later he was already on the road to the lower Ogowe, where he immediately founded the stations of Cape Lopez and Lambarene.

Having despatched his first caravan under Lieut. Mizon into the interior, De Brazza left for Loango, which had been occupied by Lieut. Cordier of the Navy, and placed M. Dolisie in charge of that place. This done he returned to Libreville and proceeded thence to Lambarene, where the main body of the expedition had been concentrated, with which he left in June 1883, for the interior. He was accompanied, amongst others, by Lieut. Mizon, by the Fathers d'Avezac and Bichet, and by M. de Rhins, who accompanied him as far as the confluence of the Lolo.

During the journey inland the posts of Njole, Ashuka, and Madiville were established. On July 22nd the head of the column arrived at Ngimi (Franceville).

Immediately after his arrival De Brazza organised the transport service between the Ogowe and the Alima, where Dr. Ballay was at the time employed in putting together a steam launch and in negotiations with the Bafuru for the free navigation of the river. The transport service having been satisfactorily organised, De Brazza joined Dr. Ballay, the negotiations were carried to a favourable conclusion, and on October 16th, 1883, Dr. Ballay was able to start down the river in a canoe, escorted by the Bafuru.

De Brazza himself embarked in the steam launch *Le Ballay* at Lekete on February 15th, 1884. He descended the Alima and then the Congo; landed at Nganchu on March 27th, and on the 30th of the same month solemnly placed the ratified treaty into the hands of the Makoko, around whom were gathered numerous feudatories. He then returned to Nganchu, continued the voyage down the Congo, and towards the end of April arrived at Ntamo, or "Brazzaville" as it is called, in conformity with a resolution of the Paris Geographical Society passed on June 23rd, 1882.

The natives received De Brazza in the warmest manner, and Mpohontaba, the representative of the Makoko, formally made over to him the territory over which he rules. M. de Chavannes was placed in charge of the station.

De Brazza left Stanley Pool on June 1st, 1884, and returned by way of the Congo and the Alima to Franceville and the Ogowe. Having ascertained that everything was going on satisfactorily under the able management of M. de Lastours, he at once returned to the Congo, where he encountered M. de Dolisie, newly arrived from Loango by the Kuilu-Ludima route. M. Dolisie asked permission to enter into relations with the Ubangi. To this De Brazza acceded. M. Dolisie was at once placed in charge of the steam launch, whilst De Brazza reascended the Alima. On December 1st, 1884 he was back at the coast.

He there organised a great expedition for the Congo. Everything being ready he started about the middle of March 1885 with 150 carriers, and reached Franceville without difficulty. The only unfavourable news which he received was that of M. de Lastours, one of his most able assistants, who died in his leader's arms at Madiville. After a prolonged stay at Franceville, De Brazza was preparing to explore the Nkunja-Ubangi, when, on July 15th, he received orders to return to France. He started at once by way of the Alima and the Congo, which he ascended to Ubangi, and reached home after an absence of two years and nine months.

Important geographical work was accomplished by the various members of this expedition. M. du Rhins mapped the Ogowe as high up as the Lolo; M. de Lastours made a flying survey of its tributary, the Nkoni, and Dr. Ballay surveyed the Alima down to its confluence with the Congo. Jacques de Brazza took charge of an exploring party which M. de Lastours was to have commanded. Leaving Madiville on July 10th, 1885, he penetrated in a northerly direction as far as lat. 2° 30′ N., and then navigated the Sekoli or Sanga down to its confluence with the Congo.* M. Dolisie, in May 1884, completed a survey of the Kuilu-Niadi, and subsequently, whilst ascending the Congo, he discovered the mouths of the rivers Mosaka and Sanga, and built the station of Nkunja on the Ubangi. Commander Cordier, whilst stationed on the coast, made some surveys in Loango, and Jacques de Brazza sent home valuable collections illustrating every department of natural science.

As to facilities for communication, as many as twenty stations were added to the five previously existing, viz. Franceville, Nkini (post of the Galoa), Brazzaville (Ntamo), Loango, and Punta Negra. The new stations were Cape Lopez, Lambarene, Njole, Okota,† Obombi,† Ashuka, Bowe, Bunji,† Madiville and Dume,† on the Ogowe; Diele, Ngambo,† Leketi and Mboshi (Pombo), on the Alima; Nkunja and Bonga † in Ubangi, and Niari Ludima, Ngotu and Lower Kuilu in the basin of the Niadi. Even more satisfactory was the fact that this solid success had been achieved without shedding a drop of blood and at the trifling cost of 90,000*l.* It is only natural under these circumstances that M. de Brazza's services should have been appreciated in France, and that the further development of this new colony should have been intrusted to him as "Commissaire du Gouvernement." Already (August 1886) several members of his staff have left France for the Congo.

Dr. Ballay's Second Journey, 1880–84.

In 1875 Dr. Ballay had accompanied M. de Brazza up the Ogowe, and crossing the watershed, had explored the Alima for several days' journey, until the hostile attitude of the natives compelled him to turn to the northward. In November 1878 he returned to France, his health having much suffered.

In November 1880 Dr. Ballay started for Africa once more. He arrived at the Gabon in March 1881, and spent the time up till July on the lower Ogowe in preparations for the great expedition which it was intended to despatch into the interior.

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* See 'Proceedings R.G.S.,' 1886, p. 648.

† Since abandoned.

This necessitated a flying visit to France, but in December he was once more on the lower Ogowe. However, the trials of the steam launches once more delayed his departure, and he employed this enforced leisure in exploring the navigable portion of the Ngunie.

At length, in August 1882, Dr. Ballay was able to start, carrying with him a steam launch named after himself *Le Ballay*. The march proved difficult and tedious, but at length the party reached Osika on the Lekila, a tributary of the Alima, where the boat was mounted and launched in June 1883.

Whilst this work was in progress Dr. Ballay explored the neighbouring Bateke country, determining numerous latitudes and altitudes. He also founded two new stations, viz. Osika (since abandoned), and Diele on the Alima, which still prospers.

The Lekila, Obia, Ankola, Assene and other head-streams of the Alima, rise in a depression which is sunk about 500 feet into the general level of the Bateke plateau. These feeders rise at once from their springs as considerable rivers, and Dr. Ballay was thus able to launch his boat upon one of them, instead of being obliged to carry it to the Alima itself. He explains this curious phenomenon by assuming that the direction of the underground waters is contrary to that of the surface waters of the plateau, which find their way to the Ogowe.

Whilst the launch was being mounted, Dr. Ballay successfully entered into negotiations with the Bafuru, who had formerly been so hostile, but whom by dint of patience he converted into friends, so that they escorted the *Le Ballay* in their canoes, when at length she started on her first voyage down the river.

The Alima rises on the eastern edge of the Bateke plateau. It is exceedingly sinuous, describing numerous curves and "loops," meandering through a broad swampy valley, the undulating sides of which are generally wooded. The width of the river varies between 180 and 400 feet. Its water is remarkably clear in the dry season, but becomes blackish as soon as the rainy season sets in (October to January). Fish abound in it—especially ganoidians—and among the specimens sent home by Jacques de Brazza was a new species of Polypterus, which has been named *P. retropinnis*. There are a few hippopotami, but crocodiles are met with only near the mouth.

The Alima only receives three tributaries of importance, namely, the Ngambo on the left bank; the Lekete and the Mpama on the right bank. In its upper course it is known as Diele, and below the confluence with the Ngambo as Mbossi or Mboshi.

The inhabitants of the Alima include the Bateke, with the Mboshi, and the Bafuru. The Bateke and Mboshi inhabit the undulating country which lies beyond the bottom-land of the river. They are great agriculturists; cultivating more especially manioc, which they sell to the Bafuru, who export every month about a thousand tons of it to the Congo. The rectangular huts of the Mboshi are grouped in villages. They are a noisy people, but sweet tempered, and by no means devoid of intelligence. Their morality is of a high standard; their women live in huts by themselves. Prostitution is unknown among them.

The Bafuru, also known as Abango, Abangho, Ubangi, and Bayanzi, are a race of boatmen, whose villages are built on the river banks, and sometimes even in the midst of marshes. Each of their villages is a centre of trade and industry, where the manioc grown by the Bateke is prepared for exportation to the Congo. The Bafuru are a peaceable tribe, at present on good terms with the Europeans, and by no means unreasonable in their demands whenever their services are called for.

When Dr. Ballay reached the lower Alima in October 1883, he found that the river formed a swampy delta, intersected by one main branch and by numerous

minor arms. One of these is known as Likuba, and on it stands the commercial capital of the Alima. The main arm of the river enters the Congo in lat. 1° 36′ S., at the head of one of those island-covered "Pools" previously referred to. There are at present three French posts on the Alima—Diele, Leketi, and Pombo (Mboshi).

From the Alima Dr. Ballay proceeded to Nganchu, where he established a post. He then visited Mbe, the residence of the Makoko, Linzolo, a station of the "Pères du St. Esprit," and Brazzaville, where he parted from De Brazza on May 5th, 1884. After a month's residence at Nganchu he returned by the Alima-Ogowe route to the coast, and again landed in France at the end of September 1884.

Dr. Ballay's Third Journey, 1885–86.

On June 14th, 1885, Dr. Ballay once more left France for the Congo, having been charged, jointly with Captain Rouvier, to lay down a boundary between the Congo State and the French possessions.

To Dr. Ballay geographers are indebted for the first reconnaissance of the Upper Ogowe, and for the first compass survey of the Alima from its confluence with the Lekila down to the Congo. They also owe him a number of positions, determined for the most part with the aid of the theodolite or "Aba," so warmly recommended by M. d'Abbadie. The longitude of Nganchu, which he furnishes, is deduced from eclipses of the satellites of Jupiter. In addition to this Dr. Ballay determined numerous altitudes.

The following are some of the positions determined by astronomical observations:—

	° ′ ″		° ′ ″
Bonga	1 7 0 S.	Point on the Congo, 2 miles S. of the Alima mouth	1 38 0 S.
Diele	1 40 30 „		
Leketi	1 37 0 „		
Pombo (Mboshi)	1 20 0 „	Brazzaville	4 16 30 „
		Ashuka (Ogowe) ..	0 5 0 „

Nganchu 3° 15′ S., 16° 6′ 40″ E. of Greenwich.

Dr. Ballay, in recognition of his great services, has recently been appointed Lieutenant-Governor of the Gabon.

Lieut. L. Mizon, 1880–83.

When the French Chambers, in 1880, had voted 4000*l.* to carry on the work of De Brazza Lieut. Mizon was entrusted with the occupation of the Ogowe, and had instructions to push eventually as far as the Congo.

He left France on November 17th, 1880, with Dr. Ballay, and on June 10th, 1881, arrived at Lambarene, on the Ogowe, whence Dr. Ballay returned to Europe. Lieut. Mizon continued to ascend the Ogowe. On July 16th he reached Ashuka, in the Okanda country, where he left a depôt of merchandise; on August 15th he surmounted the Bowe Falls, and on August 26th he entered the river Ivindo, but was stopped by a fall about 50 feet high when hardly a couple of miles above the mouth of the river. As the Osyeba asserted that the Ivindo higher up was full of falls, he desisted, and took up his residence among the Madumba. On September 22nd he arrived at the Passa river, and there built Franceville, on a site chosen and purchased by De Brazza. The latter, who had been at the head of the Alima during the last three months, arrived at Franceville on October 10th, and soon afterwards left for the coast. Up till November Lieut. Mizon was busy building the station. He then crossed the height of land which separated him from the Alima, and founded a station near the confluence of the Ngambo (since abandoned). He succeeded in organising a transport service between Franceville and the Alima, but

as the Bateke declined to carry a supply of stores to the men whom De Brazza had left at Stanley Pool, he despatched thither a French sailor and four natives of the Senegal. He then descended the Ogowe to Bunji, where he learnt that a detachment of carriers, whom he had sent from the Madumba country to meet Dr. Ballay, had been robbed on the road. He succeeded in recovering the boats which had been taken from his men, and on June 1st, 1882, arrived with them at Lambarene, where Dr. Ballay was anxiously looking for his arrival. On August 1st both started for the upper river, but as Dr. Ballay, with his heavily laden boats, travelled but slowly, Lieut. Mizon parted from him in the Okanda country, and proceeded to Franceville and the Alima. When Dr. Ballay arrived he returned to the coast, reaching Cape Lopez in January 1883. There he learnt that the French Government had decided to occupy definitely the recently explored countries, and that De Brazza had been appointed "Commissary of the Republic." Having conducted the vanguard of De Brazza's expedition to Franceville, he returned to the Gabon, it being his intention to proceed thence to Europe. De Brazza, however, prevailed upon him to make one other journey to Franceville. This done, he set his face homeward, but instead of once more descending the Ogowe, he struck direct for the coast in a south-westerly direction, which would take him through the unexplored region to the north of the Kuilu, and might possibly result in the discovery of another practicable road leading to the Congo. He started in the beginning of August 1883. He first ascended the Libombi, a tributary of the Ogowe, then crossed the watershed which separates that river from the Luete, which flows to the Kuilu, and having crossed one of the head-streams of the Nyanga, kept about halfway between that river and the Kuilu. In October he arrived at Konkuati, on the coast, and not finding a vessel there, he followed the shore and the Banya lagoon to Mayumba, where he was able to embark. Before the end of the year he was back in France.

We are indebted to Lieut. Mizon for a careful survey of the Ogowe from the mouth of the Lolo to Franceville, and of the country thence to the Upper Alima. He has likewise carefully plotted his return route from Franceville to Konkuati. His maps are based upon numerous positions determined by astronomical observations, among which are the following :—

	Lat.	Long. E. of Greenwich.
	° ′ ″	° ′ ″
Dilo, mouth	0 13 55	12 27 47
Bunji	0 47 47	12 40 27
Dumalabumba	0 48 47	12 55 45
Franceville	1 38 3	13 32 0
Post Alima-Ngambo	1 37 3	14 46 55
Olendo	1 41 12	13 12 42
Ngadi	1 47 36	13 9 42
Yubi	1 53 58	13 10 2
Nkando	3 1 22	12 50 53

Numerous altitudes were also determined. Franceville lies at an elevation of 1378 feet above the sea. The highest point crossed on the watershed between the Libombi and the Luete has an elevation of 2415 feet.

Captain Rouvier, 1885–86.

A convention between the French Government and the Congo State having been signed on February 5th, 1885, which determined the boundaries between their territories, a joint Commission was sent to the spot. Captain Rouvier of the Navy

and Dr. Ballay were appointed French Commissioners. Captain Pleigneur of the Marine Infantry accompanied them.

The Commissioners left Loango on September 1st, 1885, ascended the Kuilu to Ngotu, and then followed its right bank as far as Makabana (Franktown). They then visited the stations which had been ceded to France, viz. Zile Ngoma (Stanley Niadi), Stephanieville (which faces the post Ludima Niadi, founded by M. Dolisie), and Buenza (Philippeville). Between the Niadi and the Congo the Commissioners crossed a difficult mountain region, visiting on the route the post of Mokumbi, recently abandoned. On October 24th they arrived at Manyanga, where they stayed a month making the surveys necessary for laying down the boundary.

The boundary having been agreed upon by Captain Rouvier and Ballay on behalf of France, and by Messrs. Dannfeldt and Le Marinel as representatives of the Congo State, the Commissioners proceeded up the right bank of the Congo, past the Catholic mission station of Linzolo, and arrived at Brazzaville on Stanley Pool on December 1st.

After a stay there of a fortnight the French Commissioners embarked in the *Le Ballay*, and started for the upper river. From Nganchu Captain Rouvier paid a visit to the Makoko, at his capital Mbe. During the further progress up the river, much attention was paid to the right bank. Visits were paid to the post of the Galoa on the river Nkini, and to Bonga, another French post at the mouth of the Sanga. Finally Captain Rouvier entered the river Ubangi, and arrived on January 10th, 1886, at Nkunja, a French post situated 40 miles above its mouth, and on the left bank. As the Belgian Commissioners were only expected to arrive on January 20th, Captain Rouvier availed himself of the interval to ascend the Ubangi. He advanced to lat. 1° 16′ N., but having searched in vain for a navigable channel, was compelled to return. This want of success was due to the minor dry reason, which usually extends over twenty days, and occurs at variable periods. As the river rises 15 feet after the rains, it is quite possible for an explorer to get far beyond Captain Rouvier's furthest point, if the season is more favourable. Captain Rouvier's steam launch ran aground repeatedly. Thus, although a vessel drawing ten feet can ascend the Ubangi without difficulty in the rainy season, even a small steam launch meets with considerable difficulties when the river is low. It is, however, possible that a channel more favourable to navigation may exist.

The Boundary Commissioners having concluded their business at Nkunja on January 22nd, 1886, proceeded to the Congo, and they determined that the boundary should start from that river under lat. 0° 6′ 20″.* They separated on January 19th, 1886. Two months later they were again in France.

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* The Boundary Commissioners thus arrived at the conclusion that the Kunya (Kunja) referred to in the treaty is identical with the Ubangi or Mbanghi of later explorers, and having Mr. Stanley's map before them they could not do otherwise. The Kunya there falls into the Congo below Butunu and above a "Rocky Point," which is undoubtedly the Ngombe Bluff. The "river of the Balui" of Stanley's second map is an arm of the delta of the Mbangi. Mr. Wauters's contention ('Le Mouvement Géogr.,' 1886, No. 16) that the Kunya (Kunja) is the river of Bongo or Mbunga is quite unsupported by facts. The river which enters the Congo at the old French station of Bonga (Mbunga) is known as Sekoli in its upper course, and lower down as Sanga (Shanga) and Likuali. The Likona appears to be tributary to it. The Alima is also known as Mboshi and Likuba. On the wretched map appended to the Franco-Belgian Convention of February 6th, 1885, the boundary actually leaves the Congo under the Equator, but the "Nkunja" is identified with the Likona, which is wrongly delineated as the head-stream of the "Ubangi." If the "arbitrator" to whom this dispute is to be referred should take the same view as the French Commissioners, then the whole basin of the Ubangi will be assigned to France.—Ed.

Of the routes explored by this mission, that by the Kuilu-Niadi is available only from the mouth to Ngotu, where the first rapids occur. Thence, as far as Kitabi the river flows through a rugged woodland. Above Kitabi the river is once more navigable as far as Stephanieville. At Buenza (Philippeville) the country again rises into mountains, and the Upper Niadi flows through a narrow valley and forms numerons cataracts. The whole of the basin of this river is populous, and numerous villages are met with daily. The inhabitants are peaceable, indolent, and great consumers of palm-wine.

The region between Buenza and Manyanga presents great obstacles to the traveller, quite as much on account of its mountains, as because of the quarrelsome and inhospitable character of the Babwende who inhabit it. Manyanga has been abandoned, but as it is referred to in the boundary convention of February 5th, 1885, Captain Rouvier stayed there a month and made a careful survey of its environs, which will shortly be published on a scale of 1 : 20,000.

The first marches from Manyanga to Stanley Pool are arduous, as the mountains are of considerable height, and many ravines have to be crossed. On the other hand, provisions are easily procured, for the villages are numerous, and their inhabitants friendly to Europeans.

Stanley Pool, according to Captain Rouvier's surveys, is much smaller than it is represented to be on Mr. Comber's map, a fact already pointed out by the author in the notes accompanying his map of Africa. The distance between Brazzaville and the upper end of the "Pool" does not exceed 18 miles.

The Congo, between the "Pool" and Kwamouth has an average width of 3800 feet. A short distance above Chumbiri it broadens, and abounds in islands. Thenceforth the Congo forms a succession of expansions separated by "narrows," those at Bolobo, Lukolela, and Ngombe being more especially marked. The expansions resemble the Pool in their general features, but islands are much more numerous upon them. These characteristic features of the Congo were already pointed out by Stanley, and they will be placed on record in the large maps at present preparing for publication by Captain Rouvier and Captain Pleigneur.

Captain Rouvier's maps are based upon a careful compass survey, checked by numerous astronomical observations. Care has more especially been taken to determine the position of the French stations, and of those ceded to France by the International Association, and as a prolonged stay was made at each of these places the results can be looked forward to with confidence. A theodolite was available in addition to the sextant and artificial horizon. Geographers will certainly have cause to be grateful for the maps of this expedition, which will shortly be published on a scale of 1:300,000. The following are some of the positions determined.

	° ′ ″		° ′ ″
Makabana (Franktown)	3 26 10 S.	Manyanga	4 53 30 S.
Ludima Niadi	4 6 40 „	Brazzaville	4 16 56 „
Buenza (Philippeville)	4 11 25 „	Nganchu	3 17 3 „

Nkunja .. .. 0° 8′ 30 S.; 17° 35′ E. of Greenwich.

In conclusion, the author referred to several minor expeditions, including that of Lieut. Tenaille d'Estais to Lake Azingo, in 1882; Lieut. Minier's reconnaissance of the Ngumba or Vinue, which joins Lake Azingo to the Ogowe; and Père Angouard's journey up the Congo from Vivi to Stanley Pool in 1881, which made known to us numerous villages hitherto unknown.

A Journey in Manchuria, to the Pei-shan Mountains and the sources of the Sungari.

Mr. H. E. M. James (of the Indian Civil Service), Mr. F. E. Younghusband (King's Dragoon Guards), and Mr. H. Fulford (of the Chinese Consular Service), have recently made a vacation journey through the Chang-pei-shan mountains of Manchuria and visited the sources of the river Sungari; thus penetrating to a part of this interesting region which had not previously been reached by Europeans. The party left Moukden, the capital of South Manchuria, on the 29th May, carrying their baggage on pack-mules. They first steered due east, intending, if possible, to ascend the Yaloo or Ai-chiang river, cross the watershed, and go down the Tumen valley to Hun-chan, where the Chinese, Corean, and Russian frontiers meet. After some troublesome mountain journeys, to avoid swollen rivers, they arrived at Mao-erh-shan, 236 miles from Moukden, the furthest Chinese outpost on the Yaloo. Here they found their progress up the river barred by precipices, impracticable even for laden porters, the few colonists of the upper valley depending on the river when frozen in winter for intercommunication. They therefore turned due north up one of the tributaries of the Yaloo, crossed the main chain of mountains by a low pass, 2700 feet, and came down the Tang-ho, an affluent of the main or western branch of the Sungari. On reaching its junction with that river a guide was procured, and accompanied by two mules lightly laden, Mr. James and his friends made their way through the dense forests with which the intervening hills are covered as far as the He-ho or Black river. Here the mules had to be left behind and the baggage divided amongst the party. On the ninth day after leaving their camp, slowly marching over about 100 miles of forest, mountain, and swamp, finding shelter at night in the huts of solitary sable-hunters, they arrived at the foot of the Pei-shan, or White Mountain, from which the whole region derives its name of Chang Pei-shan, or Ever White Mountains. It was found to be a recently extinct volcano, with a lovely blue pellucid lake filling the bottom of the crater, and surmounted by a serrated circle of peaks rising about 650 feet above the surface of the water. The height of the loftiest of these was taken with the boiling-point thermometer and aneroid, and found to be 7525 feet. This is much less than has hitherto been estimated, most geographers putting it at 10,000 or 12,000 feet.* There are no glaciers, though snow lies in the clefts all the year round. The sides of the mountain, which are steep, are composed entirely of disintegrated pumice stone, and to that, and not to the snow, is due its conspicuously white aspect when seen from afar. No other mountain in the range approaches it in height, at least none other in view appeared to exceed 5000 or 6000 feet. It can only be reached during four summer months, snow preventing access to it at other times. The lake, which is called

* Compare Ravenstein's 'Russians on the Amur,' edition 1861, p. 260.

Lung-wang-tan, or the Dragon Prince's Pool, is about 1½ mile across and six or seven in circumference. It is believed by the hunters to be under the especial protection of the god of rain and to be connected with the sea. The inner sides of the crater looking down upon it are extremely precipitous. From its northern end there issues a small stream, which is the source of the Erh-tao-chiang, literally Second river, the eastern or smaller branch of the Sungari, while the main or western branch owes its origin to several streams rising on the south-east face of the mountain, two of which flow out in fine cataracts. Along the base of the mountain, 4500 feet above the sea, extends a plateau, which in summer is covered with luxuriant vegetation, exceeding in beauty even the meadows of Kashmir. Fields of scarlet and yellow lilies, blue irises, orange buttercups, variegate the landscape, while on the lower slopes is found a distinct flora, comprising a dwarf rhododendron, azalea, heather, and other flowers. Close by is a hot spring, 142° Fahr., reputed to possess much healing virtue. Ten miles from the source of the western Sungari, on the west side of the mountain, the Yaloo takes its rise, and about 33 miles farther on springs the Tumen. The Pei-shan Mountain is therefore the very core and centre of the river system of Manchuria. The party returned to their camp on the Sungari the same way it went, and as the mule track across the hills to Hunchun was reported impracticable, owing to the rains, they again turned their faces north. In seven days they reached the place where the two branches of the Sungari join, and eight days more brought them to Kirin, the capital of Central Manchuria, which they reached on the 12th August. Considerable difficulties were experienced throughout owing to incessant rain, and frequent detours over mountains were necessary to avoid impassable rivers and bogs. Supplies also were very scanty. But the robbers who are said to infest the hills were found not to exist, as the colonists and hunters have formed themselves into guilds for mutual protection and put them down. The principal enemies met with were gadflies and midges, which indeed made life at times almost unbearable, but the only real trouble was experienced at some of the ferries on the way to Kirin, where demands for blackmail were made. Time did not admit of hunting large game, even if the thick summer undergrowth of the forests had admitted of it, but tiger tracks were seen, and a bear was surprised devouring the carcase of a magnificent stag. Numerous gold-diggings were met with, the most extensive being but a few marches from Kirin, and a coal-mine and a primitive iron foundry were visited. A large number of birds and plants have been collected. A compass survey of the route has also been made, and numerous other observations have been taken, which when worked out, will add considerably to the geographical knowledge of this little-known tract of country. The party has now gone to Northern Manchuria.

GEOGRAPHICAL NOTES.

Progress of Mr. Last's Expedition.—By letter dated August 5th from the "Foot of Mount Chali, near Namuli Peaks," Mr. Last informs us of his arrival at the scene of his intended explorations. He left Blantyre, where he had passed the rainy season, as the guest of Mr. Hawes, our Consul, on the 12th of July, and struck eastward, skirting the northern foot of the Milanji Mountains, and thence proceeding through a previously unexplored country in a north-easterly direction to the Namuli Hills. He was well received by the chief, Ana Guruwé, at his principal village on the eastern side of the Lukugu river, and intended to make that his headquarters during his survey.

Emin Bey.—Direct news from Dr. Emin Bey has recently reached Europe, the first letter being dated 1st January, 1886, from Wadelai (near Albert Nyanza), addressed to Petermann's 'Mitteilungen,' and brought down by Dr. Junker. From this we learn that Emin Bey with a handful of Egyptian troops and a band of negroes was then still holding out against the attacks of the Soudan rebels, although reduced to great straits. By surrendering all the outlying stations he had concentrated his forces, and hoped to be able to hold out till help arrived from the north, or, failing this, to fight his way through to the south. He appeared, however, to be ignorant of the state of affairs in Unyoro, of the hostility of Mtesa's successor in Uganda, and the victory of the latter over King Kabrega, upon whose friendship and assistance he reckoned. It would appear also that several letters from him have been kept back by Arab traders in Unyoro, and that the letters of the Egyptian Government forwarded to him by Sir John Kirk through King Mwanga have also been opened and detained by the latter. He has practically been cut off from the civilised world since April 1883. The letter states that Dr. Junker, who we now know has got through, was about to start on the following day for Uganda, and that all his collections from Bahr-el-Gazal and the country to the far west had been lost, but that his valuable geographical papers were saved. Captain Cassati had joined Emin Bey before the outbreak of the war, and was waiting for an opportunity to escape. His collections and notes were fortunately safe. With regard to his own geographical work, Emin says that in 1883 he made an excursion to Monbuttu, and there studied the zoology of the country, but could only stay for a short time. He has also in his possession the meteorological observations made in Lado during eighteen months, together with the amount of rainfall and determinations of altitudes. He had himself until recently taken regularly meteorological observations in Wadelai. He further states that he has got the manuscript map of Lupton Bey, to which the latter refers in his paper given before the

Society in March 1884. The rainy season being over, he was expecting another attack from the side of the Bahr-el-Gazal. In conclusion, he expresses his complete confidence in the trustworthiness and ability of the negroes, stating that his recent experience has taught him "that the black race is second to none in capacity, and excels many others in unselfishness."—A letter from Emin Bey, dated Wadelai, December 31st, 1885, has also reached Dr. G. Schweinfurth. From it we learn, through a correspondent, that the Mahdi's forces first invaded the province of the Bahr-el-Gazal in March 1884, and carried off its Governor, Lupton Bey. Dr. Emin, in order to gain time, pretended that he was prepared to submit. The Mahdi's forces, for reasons not known to the writer, withdrew to Kordofan. During their absence Dr. Emin was able to withdraw most of the stores from the stations to the west of the Nile, and when they reappeared they found the garrison of Amadi (a post five days' march to the N.N.W. of Lado) in a position to offer a prolonged resistance. Famine at length overcame the valour of the garrison, which effected, however, a safe retreat upon Rejaf and Lado, inflicting (on April 1st, 1885) a severe defeat upon the pursuing enemy. Keremallah, the leader of the Mahdi's forces, soon afterwards informed Dr. Emin that Khartum had fallen and Gordon, the "enemy of God," had been killed. When no anxiously expected succour arrived from the north Dr. Emin turned his attention to the south and established himself at Wadelai. The posts lower down the river do not, however, appear to have been abandoned, and a severe punishment was dealt out to the Bari and Dinka tribes who had risen in revolt. Nor does scientific work appear to have been neglected during these troublous times, for Dr. Emin states that he has paid a visit to the Monbuttu country, where he obtained complete skeletons of two Akka, one female, the other male, several Chimpanzee skulls, new species of birds and rodents, a new species of squirrel, an anomalurus, &c. These collections are safe at present. Dr. Emin speaks highly of the handful of soldiers with him, who bore all privations without shrinking. His ammunition will suffice for another year if carefully husbanded, that is to the present month, and relief failing to reach him at the end of that time, he proposes to effect his retreat to the southward. —A letter of still later date (July 7th last) has been received by Dr. Felkin from Emin Bey. In this he states that many cases of collections have been sent to Europe, and, among others, to Professor Flower, Dr. Günther, and Canon Tristram. He concludes by stating his definite intention of remaining at his post until he has received authority from the Egyptian Government to relinquish it, and until he has provided for the safety of the vast population which, it may be said, he has rescued from the slave-dealer's ravages. Dr. Emin Bey, it seems, could meet a relief expedition at the south end of the Albert Nyanza with two steamers; this would greatly simplify the organisation of a relief expedition.

Algerian Sahara.—A full description of the orography and hydrography of the Algerian Sahara will be found in the second part of the Quarterly Bulletin (1886) of the Geographical Society of Paris. The author of the paper, M. G. Rolland, engineer of mines, had charge of the geological, hydrological, and meteorological work of the well-known Choisy mission. After dealing with the three chief natural divisions of the country, viz. the chalk plateaus of the north, the sandy or clay depressions of the centre, and the sandy dunes lying principally between Ahaggar and the Akas Mountains, M. Rolland proceeds to describe together the mountain and river systems of the country. He follows in succession the various "Ueds" or river-valleys, which he divides into two hydrographical systems, that of the great basin of the Chott Melrir to the east, and that of the Ued Messaura to the west. He appends a short notice on the subterranean waters of the Sahara.

Afghan Frontier Commission.—We hear that Captain St. George Gore, Royal Engineers, who has been with the Commission since it started from India two years ago, as one of the surveyors, and who has since then been continuously at work with Major Holdich, has parted from the mission on its return to India, and is making his way back viâ Persia. Captain Gore left Khamiab on the Oxus on August 31st, a few days before the departure of the Commission, and is taking with him some native sub-surveyors. He intends to proceed to Herat, and from there, crossing the Persian frontier, he will make his way to Birjand, and then south, across the Lût desert, to Kirman. From Kirman he will travel south again, and he hopes to reach Bandar Abbas on the Persian Gulf about the end of November—three months from the time he left the Oxus. Captain Gore, will, with the assistance of his sub-surveyors, do what surveying he can along the route without exciting the suspicion of the Persians. He takes with him some sporting rifles as presents to the Amirs of Birjand and Kirman, and the British Legation at Teheran have been asked to render him what assistance they can. We hope soon to hear of Captain Gore's safe arrival at Bandar Abbas.

Volcanic Eruption at Tarawera, New Zealand: resulting Topographical Changes in the District. (Map, p. 808.)—We are indebted to Mr. S. Percy Smith, F.R.G.S., Assistant Surveyor-General, Auckland, for copies of reports and maps relating to the memorable volcanic eruption in the Tarawera District, New Zealand, of the 10th of June last. Mr. Smith was the first explorer who ascended the volcano subsequent to the eruption, his minute observations on the occasion being recorded in a preliminary report dated June 19th. In a communication of a more recent date, September 20th, he sends us an account (published in the Auckland *Evening Star*) of some of the changes in the surface of the district, which have developed themselves since the catastrophe.

This we now lay before our readers, together with a reproduction of the MS. map which accompanies Mr. Smith's letter.

It has been ascertained that, below the vast chasm on the south end of Mount Tarawera, which was seen in the first observations, and continuing from its terminus near the bottom of the mountain to within half a mile of Lake Rotomahana, there is a huge fissure, three-quarters of a mile long by an eighth of a mile in width, its banks 150 to 200 feet high, the upper fifty feet being of ground built up with ejected matter. This tremendous earth-rent has become filled in with water, the drainage of the mountain, and now forms a new lake, absorbing and extending the little lake Rotomakariri, the name which Mr. Smith has applied to its more expansive successor. The water is at present of a dirty muddy colour. The site of the new lake, prior to the eruption, was an easy sloping valley, in which lay the original Rotomakariri, a little lake not more than an eighth of a mile in diameter. Between the new lake and the great chasm in the end of Tarawera, a small green lake intervenes, divided from the considerable sheet of water below it by a narrow, knife-like ridge, which is too sharp to walk across. The green lake is simply a crater of about 75 yards in diameter, containing a considerable quantity of water. Immediately beyond, and above it, commences the great chasm at the end of Mount Tarawera, still coloured round its margin with ferro-chlorides, which, seen at a distance, gave rise to an early report that the fissure was bordered with deposits of sulphur. This vast chasm starts about 250 feet above the level of Lake Tarawera, and extends to the top of the mountain, forming a deep gorge, averaging about 200 yards in width: its walls at the bottom are 250 feet high and are composed of black and red scoria. The floor, which follows the upward slope of the mountain, is also of scoria; steam, and occasionally a deep brown smoke issue from crevices in the side and bottom. As the adventurous explorer penetrates this gigantic chasm, hewn in a single night by the volcanic forces, its walls increase in height until they attain an altitude of about 800 feet above the floor. A strip of about a quarter of a mile separates the great rift in the south end of Tarawera from the deep fissure which has torn open the top of Tarawera and Ruawahia from one end to the other, a distance of about a mile and a half. This fissure having an average width of about 220 yards, is divided by three sharp ridges into four sections or craters, the central one about 600 feet deep. The sides and bottom are composed of scoria, from which issue steam and suffocating gases, the odour of muriatic acid being the most prominent. At the gap that separated Ruawahia from Wahanga, there is a narrow ridge, and then the fissure continues the full length of Wahanga, being divided into three craters by sharp ridges, the central one about 1400 feet deep from the summit of Ruawahia. The whole of this great gorge, except where the original formation of the mountain crops out, is covered with scoria—some of it in large blocks, but mostly fine. There is no trace of a lava flow on the mountain, although probably a bed of molten rock lies beneath the scoria deposit, which has raised the height of Ruawahia about 170 feet, and altered its outline very considerably. There is, however, abundant proof that the convulsion has not been a mere displacement of the original constituents of the mountain, but that the rock was ejected in an incandescent condition. This is not merely established by the existence of the deep beds of scoria, but by the perfect bombs that are found upon the tops and sides of the mountain. The marked difference in the character of the unchanged rocks of the old mountain and the mass of ejected matter superimposed upon it also places the question beyond conjecture. The great fissure follows the general south-west direction which was noted in its extension through Rotomahana towards Okaro. The examination of Tarawera serves to heighten rather than to lessen the first reports of the gigantic character of the eruption. It will be observed that

the volcanic explosions have not simply opened two or three small craters, but have forcibly expelled the whole centre of the massive three-peaked mountain or range for a length of about two and a-half miles, to a depth varying from 400 feet to 1400 feet. Beyond this is the enormous gorge 600 feet wide, and from 250 to 800 feet deep blown out of the side of Tarawera; then the excavation of the mass of earth and rock to form the bed of a lake three-quarters of a mile long by an eighth wide. Mr. Percy Smith made a careful examination of the condition of Rotomahana and the southern craters. The bed of Rotomahana is now about 500 feet below the old lake level, and is considerably lower than the level of Lake Tarawera, into which its surplus waters formerly flowed down the Kaiwaka Creek. Fortunately, a considerable breadth of made ground prevents any inflow from the great lake upon the Rotomahana crater, or there would be a very lively contest between the cold stream and the subterranean fires that have expelled the old waters of Rotomahana, and are still steaming and fuming from a hundred mouths. With the exception of an area of about 250 yards by 100 yards, still covered with water, Rotomahana is now entirely composed of steam holes, or craters, some of them 50 yards across. These are fuming away amid a desolation of sand and mud in flats and hillocks, the highest of these heaps of made ground being towards the northern end of the lake, near the old site of the White Terrace. A more careful survey proves that the guesses that were hazarded with respect to the height of the Black Crater considerably overshot the mark. Its external height is about 400 feet, not much more than 20 feet of it formed by the ejected matter. The depth of the crater is about 320 feet, and it is now filled with water, which continues to give off heavy clouds of steam. An eighth of a mile from this crater, Mr. Smith found a block of stone at least 100 tons in weight, which had evidently been projected from the crater, showing the gigantic force put forth during the eruption. One of the most energetic stone-spitters in this locality is situated between the Black Crater and Okaro. Some ten acres of ground around this focus afford a very interesting field of investigation for the geologist. It has not built up a cone, and the hole made by the eruption having become filled with water, a perfect example is furnished of the formation of the crater lakes with which we are so familiar. Owing to a singular echo which is produced in the vicinity of this lake, it has been named the Echo Lake Crater. Lying between this and the Black Crater, a smaller rent is still actively steaming. The other features of the adjacent country have not undergone any material change since they were last described, except that a new crater, situated on the site of what is known as the Black Terrace, has broken out, and is now throwing out considerable quantities of sand, mud, and stones. This place is about half a mile west of Rotomahana.

The East Coast of Madagascar.—M. Grandidier, the eminent Madagascar traveller and naturalist, has recently published (in the Quarterly Bulletin of the French Geographical Society) a paper on the system of lagoons and connecting channels stretching along the east coast of Madagascar.* He says that owing to the principal chain of mountains, or rather the edge of the central plateau, lying much nearer to the east than to the west coast, and presenting there a steeper slope, the rivers on that side of the island have a shorter course and receive but small tributaries. After traversing the narrow strip of country between the mountains and the coast these rivers are met by the strong current of

* This chain of lagoons and creeks was explored by Captain Rooke, R.A., in 1864, and described by him in a paper published in Journal R. G. S., vol. xxxvi. p. 52.

the Indian Ocean, which blocks up their mouths with sand and prevents them in most cases from having a direct connection with the sea. The rivers, therefore, of the east coast, more particularly between the seventeenth and twenty-third parallels, being stopped in their natural outlet, overflow and form channels and lagoons, which are separated from the coast in some places only by a sandy tract a few yards wide, in others by several miles of grass and bush-covered country. It is only from the mouth of the Ivondrona (18° 15′ S. lat.) to that of the Matitanana (22° 24′ S. lat.), a distance of about 300 miles, that these channels are navigable, and then not during all seasons of the year, as they are sometimes almost quite dry. However, they facilitate communication and the transport of goods along this inhospitable coast, where violent currents and the heavy swell render coasting almost impossible. Altogether between the two points above mentioned there are twenty-two channels, formed by more than fifty watercourses, and varying in width from a few feet to over 300 yards. M. Grandidier made a detailed survey, with the aid of the compass, of all this part of the coast, and took eighteen astronomical observations. The excellent coast map prepared by him will doubtless be used to rectify our Admiralty charts, which have been based on very vague information and give an erroneous idea of the coast-line and the lagoons. M. Grandidier concludes by enumerating the principal towns along the east coast and the different tribes inhabiting them.

Changes in the Flora of Chili brought about by European Settlement.—In a paper published in Petermann's 'Mitteilungen,'* Dr. R. A. Philippi, the well-known Chilian biologist, gives an account of the present aspect of the Flora of Chili, and shows, by statistical data, how the native plants and trees have been crowded out by European species, partly introduced intentionally by man, and partly wild species from Europe and North America, accidentally introduced, which have proved more vigorous than the native products, and are altering the aspect of the land. He remarks that it is difficult to distinguish the introduced species of wild plants, in every case, from the true indigenes, as many undoubted natives are identical with European species, a surprising fact which has previously been discussed by botanists and explained by Darwin in a well-known passage in his 'Origin of Species.' He says the early inhabitants were from the first agriculturists, and not hunters, the only large animal in the country being the guanaco, whose wool was used for clothing. Their food was almost entirely vegetable, consisting of the wild roots of the country, the potato in particular, but principally of maize, which was undoubtedly introduced into the country by its first immigrants, presumably coming from the north, or Peru. Peruvian trees, shrubs, &c., do not appear to have come into Chili during the ravages

* For 1886, Nos. X. and XI.

of the Incas; but when the Spaniards, a hundred years later, brought over the cereals and numerous kitchen-plants and fruit trees from Europe, they were cultivated to such an extent that their produce more than sufficed for the needs of the growing population. Thus extensive tracts of country, which were formerly sparsely covered with isolated bushes and shrubs, are now clothed with the waving blades of wheat and barley, or with a carpet of alfalfa (lucerne), on which thousands of horses and cattle pasture, or with large vineyards. In the southern provinces woods are disappearing every day in order to make room for cultivation, while in the north great districts hitherto unfruitful in consequence of the very dry climate have been irrigated in all directions, and are yielding profitable harvests. All the great canals of the country date from this century. The largest is the Maipu canal, which brings the water of the river Maipu to Santiago; another important canal draws off the waters of the Coquimbo which no longer reaches the sea. All cultivated land is now covered with European vegetation, so that the traveller might almost imagine himself in Europe. Dr. Philippi divides the plants introduced and cultivated in Chili into the following classes:— (i.) Trees used for timber, e.g. the oak, cedar, pyramid poplar, &c. (ii.) Fruit trees, e.g. apricot, apple, and pear. (iii.) Cereals, e.g. wheat, barley, and maize. (iv.) Fodder, e.g. white clover, pimpernel, &c. (v.) Industrial plants, e.g. rape, flax, hemp. (vi.) Kitchen herbs and vegetables, of all kinds. He gives a complete list of all the plants introduced into Chili. They amount to 332 species, of which 99 only are cultivated, and among the rest are many of the commonest European weeds and wild shrubs.

A Visit to Cayman Brac.—The 'Missionary Herald' of the Baptist Missionary Society, for November, contains an account, by Mr. J. H. Sobey, of his visit, in 1881, to Cayman Brac, a small island in the Caribbean Sea. This island is about 130 miles distant from Jamaica, 70 from Cuba, and 70 from Grand Cayman. It is about twelve miles long and two broad. The eastern end rises 100 feet perpendicularly out of the sea; the land on the top for a considerable distance is very productive. Viewed from the sea the island is wedge-shaped in appearance, as the land gradually declines to the sea-level at the western end. There are about 400 people on the island, most of whom are white. The majority of them came from Grand Cayman, and are a tall, well-developed, industrious, quiet, intelligent, and kind-hearted people. Their chief occupations are coco-nut and yam growing, turtle and other fishing. Their houses are large, clean, airy, and substantial, being built of iron-wood, candle-wood, and various other hard woods.

Copper River, Alaska; Glacial Action.—Lieut. M. S. A. Allen, of the United States Army, who was engaged in 1885, in the exploration and survey of the little-known Copper River district, between 60° and

62° N. lat., in Alaska, sends us the following note regarding glacial action in that region :—

For the study of the action of water in its relation to geographical changes, American students have always found an ample field at home; but it has not been so with respect to glacial action, for we find our most exhaustive treatise * on this subject confined almost exclusively to the glaciers of the Alps. Specialists in the future may however find a rich field in our own territories where glacial phenomena are exhibited probably on a more extensive scale than in any other country south of the Arctic circle. I refer to that portion of Alaska lying between Chilcot Inlet and Cook's Inlet, and especially to the basin of the Copper River. How far glacial action has been concerned in the determination of the topography of the valley will long be a subject for study. My observations were such as to cause a belief that an ice sheet at one time extended from the Alaskan mountains to the coast (as to how much farther from the north it came I have nothing to say). It may at first be considered at variance with the theory of contemporary upheaval of this region, with that of the ranges of the western part of the United States. If the glacial period be considered long subsequent to the upheaval, there need be no difficulty in reconciling the above. It was the ice-sea, which by its steady motion to the south has largely assisted in giving the country its present configuration. From Yakutat Bay to the mouth of Copper River, a distance of fifty miles, is an unbroken face of ice. How far this reaches to the interior through the gorges of the coast hills is unknown, though it may be safe to consider the distance equal to that of the glaciers of Copper River from its mouth. These latter may be considered an extension of the ice fronting the coast, including the above-mentioned fifty miles, which has been cut through by the river. There is every reason to believe that Miles' and Childs' Glaciers were formerly one and the same; an opinion that is in some way strengthened by the tradition of the natives. The most southernly point of the former on the left bank is one mile or less from the most northernly point of the latter on the right bank, while in the river bed between, are well-worn boulders eight to twelve feet in diameter; furthermore, on the left bank below Miles' Glacier and opposite Child's is an enormous glacial drift now covered with vegetation. Where this is joined to Miles' it is impossible to clearly distinguish the drift from the glacier. The flow of these is now from east to west for those on left bank and from west to east for those on right bank, yet this is not the general course the masses had when much larger than at present. They are at present but a residuum of the once extensive ice-fields now discharging along the paths of least resistance. Had not the climate here been moist, and in other respects favourable for glacier making, the present site would have been occupied by only drift or moraine. Farther north, above the Chittyna, on the east bank of the Copper are, for many miles, terraces large and small. The smaller ones are so regularly formed as to leave the impression that they were the fronts of old fortifications. In the river Stickine, Blake makes mention of the scarcity of well-defined terraces, while Dall also failed to observe any in the vicinity of Sitka and the Alaska Peninsula. I can only account for the remarkable width of bed of the Copper River by the supposition that it was excavated by the power of gigantic ice-masses, assisted by the eroding effects of the torrent waters from them. The volume of water in proportion to the width of bed is less than any river within my knowledge, yet the banks, as a rule, are high and rather steep. The sources of the Copper and its principal tributary, the Chittyna, are glaciers, though small in comparison with those above mentioned. By an examination of the map it

* Shaler's.

will be seen that the Alaskan mountains form an arc convex to the northward, hence the lines of least resistance of ice masses in moving from these mountains to the southward tended to intersect in the present Copper Valley. The result was the enormous power producing the remarkable excavations cited above. I earnestly hope that glacial action in this district will receive early attention at the hands of competent men. A simple inspection of the maps of Alaska, however deficient in detail they are, by a student of nature, will show that this locality was the scene of most powerful action, the traces of which are correspondingly clearly preserved. North of the Alaskan mountains I failed to observe any of these remarkable glacial phenomena, though from reports of miners they may be found in the White River Region.

North Alaska.—While active exploration has been going on in the south of the peninsula, by Lieut. Schwatka's and Lieut. Allen's expeditions, a party under the leadership of Lieut. G. M. Stoney has been doing good work in the north. On 11th July, 1885, the expedition landed at Hotham Inlet, and with the assistance of a small steamer, *The Explorer*, conveyed its winter equipment and provisions for eighteen months, up the Kowak river, to a point situated in 150° 87′ long. W., and 66° 55′ N., where a camp was constructed, and named Fort Cosmos. In the course of the winter numerous excursions were made in all directions, resulting in a thorough exploration of the country as far as the Polar Sea, a region hitherto unvisited by the white man. Lieut. Stoney in December last made a sledge journey, in company with Lieut. Howard, to the Nortok river, which they traced to its source. Early in the present year two members of the expedition, Zane and Sokoloff, travelled overland to St. Michaels, and back, while Lieut. Stoney effected a survey of the neighbourhood of Lake Selawik, and later on Lieut. Read a survey of the Kowak river. An attempt made in February, by Lieut. Stoney, to cross the watershed and reach the Polar Sea failed, in consequence of the refusal of the natives to accompany him at that season of the year through this wild and desolate region. However, on 12th April, Lieut. Howard and F. Price started with the same object, and contrived to reach the Arctic Ocean on the 25th June, at a point ten miles east of Barrow Point, having accomplished a great part of the journey on a raft along a large river, possibly the Meade river, discovered by Lieut. Ray. During the winter meteorological and magnetic observations were regularly taken at Fort Cosmos.

Iceland.—The north-west coast of Iceland, hitherto so little known, has recently been visited by M. Th. Thoroddsen, the geologist, in the course of an excursion made from Breidhi Fjord to North Cape. In consequence of the lack of roads, some parts of this coast have not been explored since the middle of the 18th century, when Eggert Plafsson visited it, but he only reached Turuf Fjord. M. Thoroddsen, notwithstanding the exceptionably bad weather experienced by him, made some interesting geological and geographical observations. At a place called Djupidalr he discovered large quantities of spar, and in several places

found specimens of fossil plants of the tertiary period. He states that the Glawa glacier is only one-half, and the Dranga glacier one-third of the size represented on existing maps.

The Map of Olaus Magnus.—The discovery by Dr. Brenner, in the State Library of Munich, this year, of the original map published by the Swedish Archbishop of Upsala, in 1539, is an event of great interest to geographers; for although such a work was known to have been in existence, no writer had seen it from the latter part of the 16th century down to present times. Indeed it was generally supposed that a much smaller map, published with an historical work by the same author, at Basel, in 1567, was a true copy of the original, This has now for the first time been brought to light through the researches of Dr. Brenner, who has done good service in reproducing it. The original is a large wall-map, in nine sheets, pasted together, and in a fair state of preservation. With the assistance of photography an excellent reduction has been made to one-half of its size without losing the sharpness of the original wood engraving; only the explanatory text in the left-hand corner below cannot be read without the aid of a magnifying glass. But all this is printed in the pamphlet, with notes and readings from later commentators, which Dr. Brenner has issued with the map, under the title of 'Die ächte Karte von Olaus Magnus vom Jahre 1539' (Christiania). The plan of the map is that its nine parts are distinguished by large capitals A to I, the districts and various details by small capitals corresponding with the explanatory text. Curious and suggestive pictures represent the various sea monsters along those northern coasts, while the perils on land are depicted in an equally forcible style. With regard to its geographical value, there are many points of resemblance between it and the map published in 1558, by Nicolo Zeno the younger, to illustrate the travels of the elder Zeni (cf. the voyages of Nicolo and Antonio Zeni, Hakl. Soc. 1874), similarities which, as Dr. Brenner points out, are not accidental, but point to the use made by Zeno of Olaus' map. Other maps of the sixteenth century appear also to have been founded upon it, and it is therefore just and right to restore the Archbishop to the place he deserves to occupy.

The Orthography of Geographical Names.—The Geographical Society of Paris appointed some time ago a Committee to investigate and report on the vexed question of the orthography of geographical names. The Committee, which met under the presidency of M. A. d'Abbadie, and included most of the geographical authorities in France, has presented its report to the Central Commission of the Society, and it has recently been published. The following are the propositions approved, and it will be seen that they closely resemble the rules of our own Society: —The geographical names of the nations using Latin characters are to be written with the orthography of the country of their origin. The rules which follow apply only to the geographical names of countries not possessing a written language or using other than Latin characters. An exception is also made in favour of names

of places which have been sanctioned by long usage, e. g. La Mecque, Naples, Calcutta; these are to be written as heretofore.

(i.) The vowels *a*, *e*, *i*, *o*, should be pronounced as in French, Italian, Spanish, or German. The letter *e* never to be mute.

(ii.) The French sound *u* to be represented by a *ü* with a tréma, as in German.

(iii.) The French sound *ou* to be represented by a *u*, as in Italian, &c.

(iv.) The French sound *eu* by the character *œ* pronounced as in *œil*.

(v.) The lengthening of a vowel to be indicated by a circumflex accent.

(vi.) The consonants *b*, *d*, *f*, *j*, *k*, *l*, *m*, *n*, *p*, *q*, *r*, *t*, *v*, *z*, to be pronounced as in French.

(vii.) *g* and *s* will always have the hard sound, as in *gamelle*, *sirop*.

(viii.) The French *ch* will be written *sh*, e. g. Shérif, Kashgar.

(ix.) *kh* will represent the hard guttural of the Arabs, and *gh* the soft guttural.

(x.) *th* will represent the sound at the end of the English word *path* (Greek θ), and *dh* the sound of the English *those* (Greek δ).

(xi.) The letter *h* will always be an aspirate.

(xii.) The semi-vowel *i* will be represented by *y* pronounced as in *yole*, and the semi-vowel *w* will be pronounced as in *William*.

(xiii.) The double sounds *dj*, *tch*, *ts*, &c., will remain as written.

(xiv.) *n* with a liquid accent, thus *ñ*, will be pronounced as in *seigneur*.

(xv.) The letters *x*, *c*, *q*, will disappear altogether, except that *q* will be employed to represent the Arabian sign *qaf*.

Obituary.

Dr. G. A. Fischer.—We announce with regret the death of this distinguished African explorer, which occurred at Berlin on November 11th. In 1876 Dr. Fischer settled at Zanzibar as a physician, and it was his intention to devote the results of his professional labours to geographical and zoological exploration. His first journey (June to September 1877) extended along the coast as far north as Wito, a territory recently acquired by Germany. In May to November 1878 he visited the same region, part of the time in the company of Mr. Denhardt. He ascended the Dana to Massa, and resided for some time at Kau, on the Ozi. His third expedition, undertaken with the assistance of the Hamburg Geographical Society, was of a more ambitious nature. Starting from Pangani in December 1882, Dr. Fischer proposed to advance either to the Victoria or to Lake Samburu. In this he failed, for illness as well as the hostile attitude of the Masai compelled him to turn back when he had reached the northern end of Lake Naivasha. His journey has nevertheless added very substantially to our knowledge of the country. More especially interesting is his account of the country to the west of Mr. Thomson's route, where he passed within a short distance of the "Mountain of God" or Doenye Ngai, an ancient volcano, apparently not quite extinct. On August 14th, 1883, he once more reached the coast at Pangani.

After a short visit to Europe, Dr. Fischer returned to Africa, having been entrusted by Herr Junker, of Moscow, with the command of an expedition to succour and rescue his brother, then believed to be shut up with Dr. Emin in the Upper Nile region. Dr. Fischer left Pangani on August 2nd, 1885, and reached Kagehi, on the Victoria Nyanza, in January. Finding the route through Uganda closed, he resolved to aim at his goal by skirting the lake on the east. But when he reached Lake Baringo he found the country devastated by famine, and, his resources failing, he

was reluctantly compelled to return to the coast. In June 1886 he was once more at Zanzibar.

Dr. Fischer was anything but a voluminous writer, and this is all the more to be regretted, as he was a careful observer and an industrious collector. Some remarks on his earlier coast-journeys will be found in the 'Verhandlungen' of the Hamburg Geographical Society (1876–7, pp. 347–362), and in the 'Zeitschrift für Ethnologie' (1878, p. 141), where he gives vocabularies. 'Das Masai-Land' (Hamburg, 1885) furnishes a concise account of the first journey into the Masai country, and is illustrated with an excellent map. He also wrote 'Mehr Licht im dunklen Weltteil' (Hamburg, 1885), of which an analysis is given in the 'Proceedings,' 1885, pp. 740–742.

REPORT OF THE EVENING MEETINGS, SESSION 1886–7.

First Meeting, November 8th, 1886.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*W. Winsley Martin, Esq.; Sir Walter Morgan; Joshua Arthur Nunn, Esq.; G. H. Taylor-Whitehead, Esq.; Edward Tregear, Esq.*

The PRESIDENT opened the Session with the following Address:—

While engaged in the collection of notes for the opening address for this session, I have been led to doubt the expediency of a practice originated, I think, by my distinguished predecessor, Sir Roderick Murchison, discontinued by some of his successors, and resumed by myself. That it has the advantage of referring to events which have occurred since our separation in June, while they are fresh in our memories, is undoubtedly true. On the other hand, it detracts from the importance and usefulness of the Annual Address, which should contain within itself a complete review and record of the principal geographical events of the year; instead of being delivered on an occasion specially devoted to it, it forms a mere prelude to an ordinary meeting, at which, as on this occasion, a paper of great interest is to be read; and, being prepared under the consciousness of this fact, it is necessarily brief and hurried, and must often fail to do justice to the progress, during a quarter of a year, of geographical knowledge. My advice, therefore, on this, the last occasion on which it will fall to my lot to deliver such an address, is that the Council should during the present session seriously consider the expediency of reverting to the original practice, and of putting an end to this fragmentary and imperfect record of events.

On the subject which has occupied so much of the thoughts of the Council, and so much space in the recent addresses of your Presidents, viz. that of Geographical Education, I have only to add that its cause has been sensibly promoted by the weighty address of the President of the Geographical Section of the British Association at Birmingham, General Sir F. J. Goldsmid, and the spirited and suggestive address of your Secretary, Mr. Douglas Freshfield, followed as they were by a very instructive discussion by some of the most competent authorities in the kingdom. By general agreement it had been held that the most effectual way of promoting this branch of education was its recognition and adoption as a subject of study and examination by the Universities. With this view I addressed a letter to the Vice-Chancellor of Oxford, which will be published in the 'Proceedings' of the Society. The proposals we made have been seriously entertained, and are now under the consideration of the Hebdomadal Council. All I can prudently add to this information is that I have fair reason for hoping that our application will meet with a considerable measure of success. The Geographical Section of the British Association gave

further practical proof of its interest in the study of geography by nominating a powerful committee for the purpose of supporting the efforts of this Society to induce the Universities of Oxford and Cambridge to appoint professors of geography.

The same section also appointed a committee for the purpose of drawing attention to the desirability of a renewal of Antarctic exploration; a subject which had been mooted at the meeting of the British Association in 1885 by Admiral Sir Erasmus Ommanney, who has addressed to this Society, in support of his views, a letter which will receive their early and careful consideration.

Although so short a time has elapsed since our Anniversary Meeting in May, when your President dwelt on the great strides which had been made during the previous twelve months in the exploration of the Congo basin, much further progress has been made in filling up the blanks in our maps of the region. The paper of Colonel Sir Francis de Winton, in June, in which he gave a summary of the latest expeditions, will be fresh in your memories; since then we have received from Mr. Grenfell an account of his numerous running surveys, made in the little missionary steamer *Peace*, up numerous previously unvisited or unknown tributaries on both sides the main stream, some of which he ascended to the furthest limits of navigation. His paper and a reduction of his numerous charts have been published in our 'Proceedings' during the vacation. The results of the important expedition down the Kasai, under Lieut. Wissmann, had previously been announced; but an addition of the highest interest to our knowledge of the whole country has quite recently been made in the accounts of the land journeys made by Lieutenants Kund and Tappenbeck and Dr. Büttner, who were sent out in 1885 by the German African Association. Both were to the south of the main river. Dr. Büttner penetrated from the old Congo capital, San Salvador, in an easterly direction to the Quango. Messrs. Kund and Tappenbeck ascended by the usual river route to Stanley Pool, and then struck boldly overland first southward and then eastward, traversing the inland region for a distance of some 600 miles, and crossing all the southern tributaries of the Congo to a new river called the Lukenye, on which they built boats and descended again to the main stream. From the description given by Lieut. Kund himself to the Geographical Section of the British Association at Birmingham, we are enabled to form a tolerably clear idea of the nature of the interior, from the coast district to the great central or inland basin of the middle Congo. On leaving the hilly or mountainous zone, which runs parallel to the coast and through which the contracted waters of the river force their way in a series of rapids and waterfalls, they found a wide extent of open steppes or savannahs, with poor soil and scanty vegetation, except along the banks of the rivers, but rich in the larger game, including elephants, and stretching over three or four degrees of longitude. This terminates abruptly at the river Sankuru, where commences the great virgin forest of the far interior, inhabited by tribes so hostile that the travellers were obliged to retrace their steps.

Whilst so much was being accomplished by German and Belgian explorers south of the Congo, the French have not been inactive in their own newly-acquired territories to the north of the great river. The discoveries and surveys of M. de Brazza, who has recently returned to Africa as Chief Commissioner of the French Ogowé-Congo possessions, have been followed up quite recently by his brother M. Jacques de Brazza, who last spring started from a French station on the Ogowé, and taking a N.N.E. direction into an unknown region, discovered another new river, the Sekoli, on which his party constructed boats and after a journey of several hundred miles reached the Congo, between the junction of the Mobangi and the Alima. The result of these and other recent explorations has been that the map of Central Western Africa which five years ago showed a wide blank, is now crowded with rivers and lakes and names of tribes, and that new fields of scientific research in almost every branch of

study have been opened, from which the naturalists have already begun to reap a rich harvest.

The critical position of several European travellers and officers of the Egyptian Government in the Upper Nile region, whose return has been cut off by the uprising in the Soudan, has continued to excite attention here and in Germany. One of them, the scientific traveller Dr. Junker, has quite recently made his escape by the southern route to Zanzibar, but Dr. Schnitzler (Emin Bey), governor of the late Egyptian Province of the Lake Region, still remains a prisoner in that dangerous post which he filled so long with eminent ability, and which recent events have rendered untenable. Two expeditions for their rescue have been sent from Germany, one, viâ Zanzibar, under the experienced traveller Dr. Fischer, who attempted first by the western shores of the Victoria Nyanza, and again by the eastern shores, to reach the Nile, but failed; the other, under Oscar Lenz, viâ the Upper Congo. The latest news of Dr. Lenz was communicated to us by Sir Francis de Winton, and was to the effect that the traveller was on his way to Lake Tanganyika with the intention of penetrating northward through the difficult and unexplored country lying between that lake and the Albert Nyanza. Great hopes are entertained that so able and experienced an African traveller as Dr. Lenz may succeed in reaching Emin Bey, but the route he has chosen is a new one, and it is doubtful if he will succeed in obtaining the requisite number of trustworthy native followers to accompany him on so hazardous a journey; indeed it is rumoured that his expedition has been since abandoned. On this account it appears probable that an attempt will be made to reach Emin Bey by the nearer route from Zanzibar, as suggested recently in the *Times* by Mr. Sclater. Dr. Fischer's rescue expedition by this route failed owing to the fanatical hostility to all Europeans shown by the new king of Uganda, the same who ordered the assassination of Bishop Hannington, and the great difficulty will be to find a route which will evade the territories of this potentate.

One of those adventurous expeditions equipped and despatched by a daily newspaper, which are among the most remarkable features of our times, has this summer been sent by the *New York Times* to explore and, if possible, ascend Mount St. Elias, a lofty peak in the snow-clad coast range of the U.S. territory of Alaska. The coast of Alaska at or near the 60th parallel of latitude, extends in a general east and west direction for more than 300 miles, and with its wall of mountains facing the moist south-westerly winds of the Pacific, presents all the conditions favourable to the display of glacial phenomena. It is only recently that this magnificent field for study, situated within easy reach of Vancouver Island and San Francisco, has attracted the attention of scientific men in America, and the expedition of the *New York Times* is one of the signs of the awakening of public interest in the subject. The expedition was under the command of the well-known Arctic traveller, Lieutenant Schwatka, Professor W. Libbey having charge of the scientific work, and included in its number a young English traveller, one of our associates, Mr. Seton Karr. From the brief accounts hitherto received we learn that it met with considerable success in its main object, the study of glacial phenomena, glaciers 20 miles wide and 50 miles long and broad ice-scooped valleys having been discovered; but the ascent of Mount Elias proved extremely difficult, and a height of 7200 feet only was attained. In the previous summer another American explorer, Lieut. H. T. Allen, investigated the basin of Copper River, to the west of the same range, and came to the conclusion that an ice-sheet at one time covered the whole coast region, and has probably determined the present configuration of the region.

In the course of the Session now opened our meetings are likely to be frequently occupied by papers and discussions on the interesting subjects of New Guinea and the larger islands of the Western Pacific. Mr. Romilly will give us an account of his visits to New Britain, at our next meeting; the Rev. J. Chalmers, the missionary pioneer and explorer of South-eastern New Guinea, will give us a description of the districts he is so familiar with, at our first meeting in January; and Dr. Doyle Glanville will at a subsequent date give us a paper on the voyage of the vessel in which he accompanied Sir Peter Scratchley, the late Commissioner, around the shores of British New Guinea. With regard to the progress of exploration in the interior of this great island, I have little to add to the account given in the Presidential Address of last May. The attempt of Mr. H. O. Forbes to reach the summit of the Owen Stanley range has unfortunately, for the present, failed; he succeeded in reaching the foot of the mountains, a distance of 65 miles from Port Moresby, but was then reluctantly compelled to return, owing to the exhaustion of his means and the termination of the period of engagement of his Amboynese followers. Notwithstanding this failure, he is confident of ultimate success by the same route, and a movement has been set on foot in the Australian colonies for providing the funds necessary to enable him to make another attempt. According to our latest news the Government of Victoria, on the proposal of Sir Graham Berry, has placed on the estimates the sum of 1000*l.* for the purpose of geographical exploration generally, a step which it is expected will be adopted by other colonies, and it is hoped that some portion of the fund may be devoted to New Guinea. Meantime, Mr. Forbes has despatched the extensive botanical collections, made during the rainy season, to the British Museum, and has accepted a post under the Chief Commissioner of New Guinea.

The following paper was then read:—

"Similarities in the Physical Geography of the Great Oceans." By J. Y. Buchanan, Esq. See *ante*, p. 753.

Second Meeting, 22nd November, 1886.—General Sir H. C. Rawlinson, K.C.B., Vice-President, in the Chair.

Presentation.—*William John Steains, Esq.*

Elections.—*William Henry Angore, Esq.; Bertram Hugh Barton, Esq.; Rev. Alexander A. Boddy; D. W. Brunton, Esq.; William Henry Catlett, Esq.; W. H. Christy, Esq.; Sydney Frere Clement, Esq.; Charles F. M. Cleverly, Esq.; John Lang Currie, Esq.; J. Kennard Davis, Esq.; Dominic A. D'Monte, Esq.*, M.D.; *Capt. F. R. Drummond (Bengal Staff Corps); Charles Elms, Esq.; Alexander Ferguson, Esq.; G. Seymour Fort, Esq.; Matthew Galbraith, Esq.; Usher G. Doyle Glanville, Esq.; Michael George Glazebrook, Esq.; Edward Gledhill, Esq.; Lord Greenock; Edward Daw Mashiter Hooper, Esq.; H. Charles Vicars Hunter, Esq.; Arthur C. Jackson, Esq.; Augustus H. Keane, Esq.; Thomas Stuart Kennedy, Esq.; Bryans Thomas Knight, Esq.; Roderick MacFarlane, Esq.; Rev. Samuel Macfarlane; J. H. Maiden, Esq.; James Edward Mason, Esq.; Edward Peter Mathers, Esq.; W. R. H. Merk, Esq.; Francis Pemberton Mockford, Esq.; William Neustetel, Esq.; Freiherr Engelbert von Orsbach; John Augustus Payne, Esq.; James Porter, Esq.; John David Rees, Esq.; Merton Russell-Cotes, Esq.; Alfred Smythe, Esq.; Capt. Walter Stewart*, R.N.; *J. B. Stone, Esq.*, J.P.; *John William Vellacott, Esq.; Nugent Charles Wade, Esq.; William Warne, Esq.; Roderick Beauclerk Webb, Esq.; William Whitacre, Esq.; Capt. Charles William Willis (4th Battalion Cheshire Regiment).*

MM. Bonvalot and Capus in Afghanistan.

Mr. Delmar Morgan said that on Friday last, having been present at the meeting of the French Geographical Society in Paris, it was announced that two distinguished Central Asian travellers, MM. Bonvalot and Capus, had been taken prisoners in Afghanistan. That announcement was received with great concern. He mentioned it with the hope that the Chairman would exert his influence with the Indian Government, and through them on the Ameer, to have the prisoners released. They had done a great deal of valuable work which had been described in their book published a year or two ago, entitled 'De Moscou en Bactriane,' and he believed another was shortly to appear with some further details of their researches on the Upper Oxus.

The Chairman informed Mr. Delmar Morgan that he believed two travellers had been stopped in Afghanistan. They were, however, in no sort of danger. All that the Ameer's officers proposed to do was to take them back to the frontier, just as they did Mr. Stephens, who was bicyling through the country. The Afghans did not like strangers going through their country. There was no political question connected with the arrest as far as he was aware.

The paper read was—

"The Islands of the New Britain Group. By H. H. Romilly, Esq. (Deputy Commissioner for the Western Pacific).

Will be published in the 'Proceedings' for January 1887.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Berlin.—November 6th, 1886: W. Reiss in the chair.—The members of the Council were all re-elected for the year 1887. Letters from Dr. Junker, dated from Kabrega's residence and Moalala, were read, in which a brief account was given of his experiences during the past year, and the hope was expressed that the Europeans shut up in the Egyptian Soudan, namely Emin Bey and Dr. Casati, would not be forgotten. He had himself done his best in this matter, and had left 2000 dollars' worth of stores in Uganda, which King Muanga had promised to forward to Emin Bey. He had been obliged to leave Uganda before the goods had been actually despatched by the King.—Herr Hartert, a companion of Flegel, then gave an account of the journey they made together to Sokoto with presents for the Sultan. They followed Gerhard Rohlfs' route to Keffi and thence to Saria, but from Saria they took a road never yet trodden by Europeans through the Samfara district and a part of Kadshena to Sokoto. In Sokoto they found many traders from Aïr who bring thither salt from Bilma, and also merchants from Timbuktu and the region of the Upper Niger. The road is unsafe on account of the many wandering gangs of robbers, and it can be travelled in security only when the tributary chiefs are on the way bringing homage and tribute to the Sultan of Sokoto.—Lieutenant Quedenfeldt next addressed the Society on the subject of his third journey to Morocco, from which he had just returned, and which he had undertaken under the auspices of the Academy of Sciences, his errand being to make zoological collections. He had at first the intention of travelling from Mogador by the military road of the Sultan to the provinces lying south of the Atlas. He did not succeed, however, in obtaining the necessary official letter, and therefore took in March 1886 the route from Mogador to Saffi, and in the middle of April went to Marakesh. In May he visited the little-known locality Urika on the Atlas. From Marakesh he travelled through the province of Erhámna, and across the plain of Shauja to Casablanca (Dar-el-beïde), and thence proceeded viâ Mehedia and Alkassar to Tangier.

Congress of German Naturalists.—The fifty-ninth Congress of German naturalists and medical men was held from the 20th to 23rd of September last. The two sections more particularly concerned with geography were well attended, viz., the Geographical and Ethnological section, which numbered 76 members, and at which 13 papers were read; and the section for Medical Geography, Climatology, and Tropical Hygiene, with 105 members and 14 papers. At the former the African continent received a large share of attention, Dr. Büttner, Lieutenants Tappenbeck, Kund, Count Pfeil, Müller, and Standinger giving accounts of their several journeys. Dr. Sievers read a paper on the Aruacos of Venezuela, and Dr. v. d. Steinen on the Ethnography of South America. Perhaps the chief feature of the Congress, as far as geography is concerned, was the paper of Dr. Schweinfurth on Europe's Problems and Prospects in Tropical Africa, which will be found published *in extenso* in the 'Deutsche Kolonialzeitung' of the 15th October. He discusses the economic problems and lays special stress on the necessity of a thorough botanical exploration of the country; he also deals with the question of native labour. Dr. Wolff gave an interesting account of his travels in the Congo Basin and his voyage down the Sankuru. Special interest attached to the latter of the two sections above mentioned, which, as the President said in his concluding address, although of recent formation, promises to be exceptionally successful. Its importance lies in the fact of the direct bearing of its proceedings on the now active colonial policy of Germany. Among the papers read, the following may be mentioned:—'The Climatical Conditions of the Cameroons,' by Dr. B. Schwatz, of Berlin; 'Notes on Tropical Hygiene from personal experience in West Africa,' by Dr. Wolff; 'The Climate of the Transvaal,' by Herr A. Merensky. 'The Climatical and Meteorological Conditions of South Brazil,' by Herr Karl v. Koseritz, being the result of his residence of thirty-six years in the province of Rio Grande do Sul; 'What is wanting in the system of colonisation as hitherto pursued?' by Count Anrep-Elympt. All these papers were followed by discussions, in the course of which many points of interest and importance were elicited.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. Scott Keltie, *Librarian* R.G.S.)

EUROPE.

[Alpine.]—Jahrbuch des Schweizer Alpenclub, 1885–1886. Bern, 1886.—Zeitschrift des Deutschen und Oesterreichischen Alpenvereins. Redigirt von Th. Trautwein. Jahrgang 1886. Band xvii. München, 1886.

In the former of these journals are two papers which may interest geographers—one on the periodical variations of Alpine glaciers, and the other a report on the measurements of the Rhone glacier made in 1885.

In the journal of the German and Austrian Alpine Club we find papers on the Origin of the Alps, by Dr. Karl Haushofer; on the Temperature Conditions of the Eastern Alps, by Dr. Julius Hann; a sketch of the orography of the Lechthal Alps, by Anton Spichler; a very complete study of the Wendelstein group (the north-east corner of the Bavarian Alps west of the Inn), by Dr. F. Ratzel, Dr. Erk, and Dr. Dingler, accompanied by a panoramic view.

[Birmingham.]—Handbook of Birmingham. Prepared for the Members of the British Association, 1886. Birmingham, Hall & English, 1886: 12mo., pp. xxi. and 378, map.

Den Norske Nordhavs-Expedition, 1876-1878.—[The Norwegian North-Atlantic Expedition, 1876–1878.], Zoologi. Crustacea, II. Ved G. O. Sars.

Christiania, Grøndahl & Sons, 1886: imperial 4to., pp. 96, map. [Presented by the Editorial Committee of the Norwegian North-Atlantic Expedition.]

The Mason Science College, Birmingham. Calendar for the Session 1886–1887. Birmingham, Cornish Bros., 1886: small 8vo., pp. 260 and lxxvi.

ASIA.

Bassett, James.—Persia: the Land of the Imams. A Narrative of Travel and Residence, 1871–1885. London, Blackie & Son, '1887 [1886]: small 8vo., pp. xvii. and 342, map. Price 7*s.* 6*d.* [Presented by the Publishers.]

A considerable portion of this volume is devoted to a description of the author's journey to Persia, and to his journeys within the country. Much useful information will be found regarding the various towns and villages on the routes. Among the various places visited may be mentioned Urumiah, Tabriz, Casvin, Tehran, Hamadan, Ispahan, Rasht, Baku, Tiflis, and Mashhad. The remaining portion of the volume is occupied with a description of the country in its various aspects, including the geography; the soil and productions; population; state of civilisation; languages; manufactures; condition of the people; social customs; government; missionary work, past and present; &c., &c. The map represents Persia and its Border Regions, and shows the routes followed by the author.

[India.]—Colonial and Indian Exhibition, 1886. Empire of India. Special Catalogue of Exhibits by the Government of India and Private Exhibitors. London, Clowes & Sons, 1886: 8vo., pp. vi. and 317. Price 1*s.*

This is more than a mere catalogue. In connection with the various classes of exhibits it gives much information on the various aspects of the geography of the country. The most original and valuable sections are those which deal with the Economic Court and the Ethnology, both by Dr. George Watt, C.I.E.

——— Synopsis of the Results of the Operations of the Great Trigonometrical Survey of India. Vol. XIIIA. Account of the Final Reductions with the details of the South Parasnath Meridional Series and the South Maluncha Meridional Series of the South-east Quadrilateral. Prepared in the Office of the Trigonometrical Branch, Survey of India, Colonel C. T. Haig, R.E., Offg. Deputy Surveyor General, in charge. Published under the orders of Colonel G. C. De Prée, R.E., Surveyor General of India. Dehra Dun, printed at the Office of the Trigonometrical Branch, Survey of India, 1885: 4to, pp. xii., xiv. [49], and 69, charts, &c.

[Sarawak.]—Quelques Notes sur Sarawak (Borneo). Par E. Cotteau. Paris, Leroux, 1886: pp. 9. [Presented by the Author.]

A summary of our present information on Sarawak.

AFRICA.

[East Africa.]—Abriss der Kulturgeschichte Ostafrikas. Von Dr. Grimm. 'Verhandlungen der Badischen geographischen Gesellschaft zu Karlsruhe, 1884–6,' pp. i.–lvi.

Dr. Grimm divides the progress of civilisation in East Africa into six periods, from the earliest times down to the present day. The last period he designates the German period, and began last year with the appearance of a German fleet at Zanzibar.

Kerr, Walter Montagu.—The Far Interior: A Narrative of Travel and Adventure from the Cape of Good Hope across the Zambesi to the Lake Regions of Central Africa. 2 vols. London, Sampson Low & Co., 1886: vol. i. pp. xvi. and 316; vol ii. pp. viii. and 318. Price 32*s.* [Presented by the Publisher.]

Mr. Kerr gave a very full account of his adventurous journey at one of our evening meetings; his paper will be found in the 'Proceedings,' February 1886, p. 65, and may be accepted as a sketch of the ground traversed in the two volumes

before us, and of the leading results of his expedition. Starting from Port Elizabeth in the beginning of 1884 (there is a paucity of dates in Mr. Kerr's narrative), he proceeded northwards, skirting on the west the Orange Free State and the Transvaal, and on through Matabele Land and Mashona Land, meeting by the way Mr. Selous, from whom he obtained important advice and assistance. In the Makorikori country Mr. Kerr made one or two side excursions, and at Chibinga diverged eastwards to Tete on the Zambesi. In the latter part of his journey Mr. Kerr broke to some extent on new ground, and his observations on the country and people are therefore acceptable. Perhaps the most interesting section of his work is that which deals with the journey from Tete to Lake Nyassa, where he was greatly disappointed at finding the Livingstonia Mission Station abandoned. In this part of the journey Mr. Kerr endured great hardships. His notes are important as showing the actual condition of the country in this region. At Livingstonia Mr. Kerr met Lieut. Giraud returning from Lake Tanganyika, and the two journeyed down to the coast at Quillimane. Mr. Kerr would have done well to condense his work into one volume, omitting unimportant details. It is a pity that his instruments failed, as on that account his observations lack the scientific value they might otherwise have had. Still the geographer will find a good deal of useful information in the two volumes, and the general reader numerous interesting episodes. There are numerous illustrations, and a map on the scale of 38 miles to an inch, with a section of the route from Port Elizabeth to Lake Nyassa and Quillimane.

Oliver, Samuel Pasfield.—Madagascar: An Historical and Descriptive Account of the Island and its former Dependencies. 2 vols. London, Macmillan & Co., 1886: 8vo., vol. i. pp. xix. and 569; vol. ii. pp. x. and 576. Price 52*s.* 6*d.*

This is an encyclopædic compilation, consisting to a large extent of extracts from the works of well-known authorities on Madagascar. Captain Oliver has not taken much trouble to co-ordinate, arrange, and condense his material. Still the book will be useful as a reference-book to those who have not the time to search for information on this interesting country through the multitude of existing works on the island. A chapter of some length is devoted to an historical sketch of Madagascar, followed by a short one on its geography, and three chapters on the topography, which is treated in minute detail. The three concluding chapters in the first volume deal with climatology, zoology, and natural history. In the second volume we find chapters on natural and agricultural products, ethnology, manufactures, administration, trade and revenue, currency, weights and measures, and bibliography and cartography. This last is one of the most valuable chapters in the book, the bibliography being mainly a reproduction of Mr. Sibree's recent lists. There is a section of some original value, containing an abstract of MSS., books, and papers respecting Madagascar during the possession of Mauritius by the French, that is, prior to 1810, presented by Sir Walter Minto Farquhar to the British Museum. A large section of the second volume is devoted to the Franco-Malagasy war. There are altogether nineteen maps in the two volumes, from various sources, and illustrating most of the aspects of the country dealt with.

[Palestine.]—Palestine Exploration Fund. Twenty-one Years' Work in the Holy Land (a Record and a Summary), June 22nd, 1865–June 22nd, 1886. Published for the Committee of the Palestine Exploration Fund. London, Bentley & Son, 1886: 8vo., pp. 232. Price 6*s.* [Presented by the Publisher.]

This is an instructive popular summary of the twenty-one years' work of the Palestine Exploration Society. It points out in general terms the Biblical gains of the Society, and it shows, also in general terms, what remains to be done. After a sketch of the foundation of the Society, and a chronicle of its work at headquarters, the author ("W. B.") goes on to describe briefly the various expeditions and investigations, and their results, concluding with an obituary of those officers who have died while the work was in progress, and a sketch of the work of the future. There are appendices containing a chronological summary of the Fund's work, and a list of Captain Conder's identifications in Western Palestine. There are numerous illustrations.

AMERICA.

[Argentine Republic.]—Estadística del Comercio y de la Navegacion de la República Argentina, correspondiente al Año 1885. Publicacion Oficial. Buenos Aires, Stiller & Laass, 1886: large 8vo., pp. xxix. and 356, map. [Presented by the Argentine Government.]

[Canada.]—Colonial and Indian Exhibition, London, 1886. Descriptive Catalogue of a Collection of the Economic Minerals of Canada, by the Geological Corps, Alfred R. C. Selwyn, C.M.G., &c., Director. London, printed by Alabaster, Passmore & Sons, 1886: 8vo., pp. 172, illustrations. [Presented by the Director of the Geological and Natural History Survey of Canada.]

Doering, Oscar.—Observaciones Meteorológicas practicados en Córdoba (República Argentina) durante el Año de 1884. Buenos Aires, 1885: 8vo., pp. 90.

——— La variabilidad interdiurna de la Temperatura en algunos puntos de la República Argentina y de América del Sur en general. III. Variabilidad de la Temperatura de Ushuaiá. Buenos Aires, 1886: 8vo.

——— Resultados de algunas Mediciones Barométricas en la Sierra de Córdoba. Buenos Aires, 1886: 8vo., pp. 20.

Gordon, [Rev.] Daniel M.—Mountain and Prairie; a Journey from Victoria to Winnipeg, viâ Peace River Pass. With maps and illustrations. London, Sampson Low & Co., 1880: cr. 8vo., pp. x. and 310.

An account of an exploration, in 1879, of the country between Port Essington, in British Columbia, and Winnipeg. On leaving Port Essington, the Skeena river was ascended as far as Hazleton; thence on foot to Babine; up Lake Babine; down Stewart's Lake to Fort St. James; across country with a mule train to Fort M'Leod; down the Parsnip and Peace rivers to Dunwegan; thence by way of the Lesser Slave Lake to Edmonton, and across the prairies to Winnipeg.

Lorne, The Marquis of.—Our Railway to the Pacific. With illustrations by H.R.H. Princess Louise. Reprinted from 'Good Words.' London, Isbister & Co., 1886: 8vo., pp. 32. [Presented by the Canadian Pacific Railway Company.]

Pétitot, Émile.—Traditions Indiennes du Canada Nord-Ouest. Paris, Maisonneuve Frères et Ch. Leclerc, 1886: 12mo., pp. xvii. and 521. [Presented by the Author.]

This is a useful and entertaining collection of folk-tales collected by the well-known Abbé Pétitot during his sojourn of twenty years as a missionary in the North-west of the Dominion of Canada.

Wells, John W.—Exploring and Travelling Three Thousand Miles through Brazil from Rio de Janeiro to Maranhão. 2 vols. London, Sampson Low & Co., 1886: 8vo., vol. i. pp. xix. and 411; vol. ii. pp. xii. and 374. Price 32*s*. [Presented by the Publishers.]

Mr. Wells's highly instructive paper on the Delta of the Tocantins will be remembered ('Proceedings R.G.S.,' August 1886, p. 513). That was one result of his long residence in Brazil, the full record being given in the two volumes just issued. Mr. Wells went to Brazil seventeen years ago as an engineer, and in that capacity traversed the interior of the country from Rio de Janeiro to Maranhão, besides visiting several of the towns on the coast. He thus had excellent opportunities for observation, especially as his surveying operations compelled him to traverse considerable sections of the country at his leisure. Instead of writing a general work on Brazil, Mr. Wells endeavours to depict the aspect of a given line of country with its many varying scenes and differences of climate, the incidents of "roughing it" in the backwoods, and

the many "sorts and conditions" of humanity met with on the way. Although Mr. Wells's narrative refers to events of about ten years ago, it is quite fresh, and besides being highly entertaining, contains much that ought to interest the geographer. Mr. Wells's first stage was from Rio de Janeiro by Barbacena to Capella Nova on the Parãopeba, and here he carried out the first section of his survey. Mr. Wells was one of a staff of engineers organised by the Public Works Construction Company, of London, to carry out a contract with the Brazilian Government to make certain explorations and surveys in the interior of Brazil. The work was divided into two sections: the first, a survey down the valleys of the Rio Parãopeba and the Rio São Francisco, as far as the Cachoeira of Pirapora on the latter, for the purpose of determining the relative advantages of this route, or that of another down the Rio das Velhas, for the final extension of the D. Pedro II. Railway to such a point as would bring its traffic into direct communication with the navigation of the Rio São Francisco. The second section consisted of an exploration by route surveys, barometrical levellings, and reports upon the districts between the Rios São Francisco and Tocantins, with the view of obtaining knowledge of the best routes, ways, and means for connecting the traffic of the navigable São Francisco with that of the Tocantins, in order that, upon the completion of the D. Pedro II. Railway, a grand line of internal communication might be created from Rio de Janeiro to the Valley of the Amazons. In carrying out the minute surveys necessary for the purpose in view, Mr. Wells necessarily saw much of the country and the people, and the record in these two volumes proves how well qualified he was to take advantage of so exceptional an opportunity. His line of route embraced much of the upper course of the São Francisco to its junction with the Rio das Velhas; then eastwards and northwards by Conteridas to the São Francisco at Januaria, and down the west bank of the river to Carinhanha. The party then took to the river as far as Barra do Rio Grande, and across country to Baqueirão at the junction of the Rio Grande and Rio Preto. Here began what is perhaps the most novel and instructive section of Mr. Wells's eventful exploration. The Rio Preto was followed up to the mouth of the Sapão, which again was traced to its source. Then through the hilly prairie land in the north of Goyaz, partly along the bank and partly on the waters of the Rio Somma, to the Tocantins. That river was followed down to Carolina; thence by land to Chapada in the middle course of the Rio Grajahu; down that river to Vicuna on the Rio Mearim, and thence to Maranhão on the Atlantic. Mr. Wells in the course of his long journey through a country of varied features, gives many sketches of real value of its physical conditions, its natural productions, and its curious mixed population. Some of the more scientific information he has collected into appendices, including details of the survey of the Parãopeba, São Francisco, and Tocantins. Other appendices deal with the climate, gold and diamond mining, railways, sugar factories, the past, present, and future of Brazil, and its physical geography. This last is the paper read by Mr. Wells at the Royal Geographical Society. There are numerous illustrations, many of them not quite worthy of the book; the general map, on the scale of 100 miles to an inch, with section from Rio de Janeiro to Maranhão, is very full of information. The special physical map is reproduced from the 'Proceedings' of the Society.

AUSTRALASIA.

Jack, Robert L.—Colonial and Indian Exhibition of 1886. Handbook of Queensland Geology. Brisbane, Warwick & Sapsford, 1886: 8vo., pp. 107. [Presented by the Author.]

OCEANIA.

Cust, Robert Needham.—VII. Internationaler Orientalisten-Congress, Wien. Malaisch-Polynesische Abtheilung. Mittheilung über unsere gegenwärtig Kentniss der Sprachen Oceaniens. London, Trübner & Co., 1886: 8vo., pp. 22. [Presented by the Author.]

Thomas, Julian.—Cannibals and Convicts: Notes of Personal Experiences in the Western Pacific. Portraits and map. London, Cassell & Co., 1886: 8vo., pp. xvi. and 408. Price 10*s.* 6*d.* [Presented by the Publishers.]

Mr. Thomas, under the cognomen of "The Vagabond," acts as correspondent to the *Melbourne Argus* and the *Australasian*, and the contents of his volume have been to a large extent published in those journals. In pursuit of his vocation, Mr. Thomas visited Fiji (in Thakombau's time), Norfolk Island, of whose people and general condition he gives an interesting account, New Caledonia, the New Hebrides, and New Guinea. The bulk of the volume is devoted to New Caledonia and the New Hebrides. In the case of the former, Mr. Thomas's mission was to watch the progress of the rising of the natives against the French; he tells us a good deal concerning the social and administrative condition of this French colony. In like manner Mr. Thomas deals with the New Hebrides, mainly from the political and social point of view. His sketches of native life and of the intercourse between Europeans and natives are instructive. There is a very small map of part of the Western Pacific. As the work has no index it is of little use for reference.

GENERAL.

Carusso, C. D.—Importance de la Cartographie Officielle. Étude sur l'Ordnance Survey du Royaume-Uni de Grande-Bretagne et d'Irlande. Genève, Schuchardt, 1886: 8vo., pp. 51. [Presented by the Author.]

M. Carusso has made a special study of our Ordnance Survey, and the present brochure is a sketch of its organisation, methods, and results, with a view to show the importance of the work which has been accomplished by the department, and to indicate the "imperious necessity" for every government to keep up to a high standard its official cartography.

Clyde, James [M.A., LL.D.]. — School Geography. 23rd edition, revised throughout and partly recast. Nine maps. Edinburgh, Oliver and Boyd, 1886: small 8vo., pp. 551. Price 4*s.* (Presented by the Publisher.)

Dr. Clyde thinks the "old ways" in geography much better than the new ways advocated by the Royal Geographical Society. "A manual containing only what some expert may deem the minimum of geographical information, can meet the wants only of those who are like-minded with the expert. It is certain that a far greater number will be differently minded from him and from one another [a curious sentence]. . . . Teachers desiderate minuteness in the treatment of the countries in which they respectively teach." The book then is evidently meant for the teacher and not for the pupil, confirming the position of the Geographical Society, that the great majority of our teachers are themselves so ignorant of geography that they are helpless without a text-book. To such teachers Dr. Clyde's book will be found of service; it is no doubt the best text-book we have in English written upon the old lines. It is a trustworthy collection of facts, with little or no attempt to show the intimate relations between one class of facts and another. We confess, however, we fail to see what purpose is served by such lists as those on pp. 384–5.

Merensky, A.—Wie erzieht man am besten den Neger zur Plantation-Arbeit? Berlin: Walther and Apolant, 1886: 8vo., pp. 39. Price 6*d.*

This is a prize essay which obtained the award offered by the German East African Society for a paper on the subject of the best means of teaching the negro to work. The author does not believe that the negro has any inherent dislike to labour, and his essay consists of a series of rules and regulations by which any colonial government should be guided in its treatment of the natives in its territory. M. Merensky objects to slavery, but substitutes a paternal care over the natives, and in some cases a system of "apprenticeship." His method is essentially that adopted by the British South African colonies. As to religion, he maintains that the question is between Christianity and Mahommedanism, and not heathenism. Mahommedanism, he maintains, is a bar to all progress.

[National Surveys.]—Report upon the Third International Geographical Congress and Exhibition at Venice, Italy, 1881. Accompanied by data concerning the principal Government Land and Marine Surveys of the World. Prepared and submitted by Captain George M. Wheeler, Corps of Engineers, U.S. Army, Commissioner and Delegate. Washington, Government Printing Office, 1885: 4to., pp. 586. [Presented by Captain G. M. Wheeler.]

This is a welcome addition to the literature of the Venice Congress. The work contains much more information than what Captain Wheeler was able to collect at that Congress. To the Congress and the accompanying exhibition the first 75 pages of the work are devoted. Captain Wheeler made it his business, in addition, to collect information on the spot or by correspondence concerning the methods and results of the surveys of nearly all countries in the world which have such institutions. The result is a mass of well-arranged information which will be of permanent value for reference. Both topographical and geological as well as marine surveys are included. After a general introduction on Land Surveys (pp. 76-158), Captain Wheeler takes up separate countries, beginning with Great Britain and Ireland and the Colonies, India being treated separately. Then follow Germany and her leading subdivisions, and every other European State except Servia. In Asia, in addition to India, we have Japan. In America, besides the United States and Canada, there are notices of the surveys of San Domingo, Argentine Republic, Bolivia, Chili, and a general section on the Geological Surveys of South and Central America. Then follows a special section on the leading Marine Surveys (pp. 497–538). Section IV. contains a list of works of reference on various surveys, and Section V. describes and discusses various methods of reproduction,—heliogravure, photozincography, chromolithography. Section VI. contains various extracts. Accompanying the Report are, (1) A map of the World showing areas of systematic detailed topographical surveys, trigonometrically based, completed, in progress, and proposed. (2) Sketch, showing divisions and extent of the general topographical surveys trigonometrically based, of Europe. (3) Index to Atlas of India. (4) Sketch showing proposed disposition of sheets for a general topographical Atlas of the United States, 1875. In addition there are six fine quarto plates showing various methods of reproducing topographical features, which might be of service to those who are attempting to improve our school wall-maps and atlases.

Norman, C. B.—Colonial France. London, Allen & Co., 1886: 8vo., pp. xii. and 331. (Presented by the Publishers.)

Captain Norman has compiled from well-known and accessible French sources a series of notices, historical and statistical, on the various French colonies, which will be of some service to those who cannot read French. There is very little about the geography of the colonies, and Algeria is omitted altogether, though it is essentially a colony. Captain Norman could easily have got the statistics for 1885, instead of 1880 and 1882, had he gone to the departmental official publications.

Stephen, Leslie.—Dictionary of National Biography. Vol. viii.—Burton-Cantwell. London, Smith, Elder, & Co., 1886: 8vo., pp. vi. and 458. Price 12*s.* 6*d.*

Thayer, Russell.—Earthquakes: a Scientific Investigation of the Method of Action of these Terrestrial Phenomena, and a Theory of their Primary Cause. Philadelphia, 1886: large 8vo., pp. 13, plan.

[The 'Challenger Voyage.']—Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873–76, under the command of Captain George S. Nares, R.N., F.R.S., and the late Captain Frank Tourle Thomson, R.N. Prepared under the superintendence of the late Sir C. Wyville Thomson, Knt., F.R.S., and now of John Murray. Zoology—Vols. xv. and xvi. London, Longmans and Co., &c., 1886: 4to., pp. (vol. xv.), 24, v., 756 and 50; (vol. xvi.)

viii., vi., 245, 116, 203 and 136; chart and plates. [Presented by the Lords Commissioners of Her Majesty's Treasury.

The Encyclopædia Britannica. A Dictionary of Arts, Sciences, and General Literature. Ninth edition. Vol. xxi. Edinburgh, A. and C. Black, 1886: 4to, pp. 856. Price 30s. [Presented by the Publishers.]

This volume extends from the words ROTHE to SIAM. It contains several important geographical articles. One of the most complete accounts of the geography of Russia in English is furnished by M. Krapotkin. It is divided into three parts: I. General survey of the Russian Empire. II. European Russia—Geography. III. European Russia—Statistics. The geography of Roumania, Servia, and Sardinia is by Mr. G. G. Chisholm; Sahara, by Mr. H. A. Webster; a longish article on the river St. Lawrence, by Sir Charles A. Hartley; St. Petersburg and Samarkand, by M. Krapotkin; Saxony, by Mr. Findlay Muirhead, and Schleswig-Holstein by Mr. J. F. Muirhead; Senegambia, by Mr. D. Kaltbrunner; Siam, by Mr. Coutts Trotter; the physical features of Scotland are described by Dr. A. Geikie, and the Statistics are by Mr. T. F. Henderson.

The following works have also been added to the Library:—

Blackie, W. G.—The Imperial Gazetteer; a General Dictionary of Geography, Physical, Political, Statistical, and Descriptive. With a Supplement, bringing the Geographical Information down to the latest dates. Half-volume III. Jaak—Port-Vendres, and Half-volume IV. Port-William—Zywiecz. London, Glasgow, and Edinburgh, Blackie & Son [n. d.], imp. 8vo., illustrations. [Presented by the Publishers.]

Canada under the National Policy. Arts and Manufactures, 1883. Montreal, the Industrial Publishing Company, 1883: 4to., pp. 176, portraits and illustrations. [Presented by the Canadian Pacific Railway Company.]

[Central Asian Gazetteers.]—Gazetteer of Afghánistán; Part I.: including the Provinces of Kábal, Afghán-Turkistán and Badakhshán-Wakhán; and the Independent States of Chitrál, Káfiristán, and Kuram. Compiled (for Political and Military reference) by Lieut.-Col. C. M. MacGregor, in 1871, and brought up to date by Lieut.-Col. W. S. A. Lockhart, C.B., in 1882. Vols. i. and ii. Calcutta, Office of the Superintendent of Government Printing, 1882.—Plans and Maps to accompany Gazetteer of Afghánistán, Part I. Calcutta, ditto, 1884.—Gazetteer of Afghánistán, Part III.: including Péshín, Sharód, and Shoráwak. Compiled ... by Capt. P. J. Maitland. Brought up to 31st December, 1882. Simla, Government Central Branch Press, 1883: maps and plan.—Gazetteer of Afghánistán. Appendices to Part III. (Péshín, Sharód, and Shoráwak). Compiled . . . by Capt. P. J. Maitland. Brought up to 31st December, 1883. Calcutta, printed by the Superintendent of Government Printing, India, 1884: maps, 8vo. [Presented by the Secretary of State for India.]

Central Asia.—Part I. A Contribution towards the better knowledge of the Topography, Ethnography, Statistics, and History of the North-West Frontier of British India. Compiled (for Military and Political reference) by Lieut.-Col. C. M. MacGregor. Vols. i., ii., and iii. Calcutta, Office of the Superintendent of Government Printing, 1873.—Central Asia. Part III. A Contribution towards the better knowledge of the Topography, Ethnology, Resources, and History of Belochistan. Compiled . . . by Capt. W. S. A. Lockhart. Calcutta, Office of the Superintendent of Government Printing, 1875.—Central Asia. Part IV. A Contribution towards the better knowledge, &c., of Persia. Compiled . . . by Lieut.-Col. C. M. MacGregor. Calcutta, Office of the Superintendent of Govern-

ment Printing, 1871.—Central Asia. Part V. A Contribution towards the better knowledge, &c., of part of Asiatic Turkey and Caucasia. Compiled by Lieut.-Col. C. M. MacGregor. Calcutta, Foreign Department Press, 1872.—Central Asia. Section I., Part VI. A Contribution towards the better knowledge, &c., of the Khanat of Khiva. Compiled . . . by Capt. H. Collett, maps. Section II., Part VI. A Contribution towards the better knowledge, &c., of the Khanat of Bokhara. Compiled . . . by Capt. John Moubray Trotter. Calcutta, Foreign Department Press, 1873.—Central Asia. Part VII., Section I. A Gazetteer of Kashmír and the adjacent districts of Kishtwár, Badrawár, Jamú, Naoshera, Púnch, and the Valley of the Kishen Ganga. Compiled . . . by Charles Ellison Bates. Calcutta, Office of the Superintendent of Government Printing, 1873, maps. Part VII., Section II. A Contribution towards the better knowledge, &c., of Ladak. Compiled ... by Lieut. F. Maisey. Calcutta, Office of the Superintendent of Government Printing, 1878. [Presented by the Secretary of State for India.]

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Bielefeld.—Plan der Stadt —— von H. Gier. Scale 1:3000 or 24·3 inches to a geographical mile. Bielefeld, Pfeffer. Price 6*s*. (*Dulau.*)

Dobrudscha zur Übersicht der deutschen Kolonien. Entworfen von Dr. B. Schwarz. Scale 1:1,200,000 or 16·4 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1886, Taf. 17. Justus Perthes, Gotha. (*Dulau.*)

France.—Carte de ——, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, Hachette et Cie., 1886. Sheets: VII.—19, St. Nazaire; VIII.—10, Les Pieux; VIII.—18, Redon; IX.—10, Cherbourg; XII.—27, Barbezieux: XVI.—11, Beauvais; XVII.—10, Montdidier; XXII.—21, Châlon-sur-Saône; XXIII.—22, Lons-le-Sauniea; XXIII.—23, Oyonnax; XXIII.—24, Nantua; XXV.—36 Bormes. Price 7*d*. each sheet. (*Dulau.*)

Ischl und Hallstadt.—Umgebungskarte von ——. Scale 1:75,000 or 1 geographical mile to an inch. Herausgegeben vom K. k. militär-geograph. Institut in Wien. Price 1*s*. 6*d*. (*Dulau.*)

Italia.—Carta d' ——. Scale 1:50,000 or 1·4 inches to a geographical mile, and 1:25,000 or 2·9 inches to a geographical mile. Istituto geografico militare, Firenze, 1886. Sheets: 5—II.; 8—I., II., III., IV.; 9—III.; 15—I., II., III., IV.; 19—I., II., III., IV.; 20—III., IV.; 25—IV. N.E., S.E., S.O., N.O.; 34—I., II., III., IV.; 35—IV.; 47—I. N.E., S.E., S.O., N.O.; 47—II. N.E., S.E., S.O., N.O.; III. N.E., S.E., S.O., N.O.; IV. N.E., S.E., S.O., N.O.; 62—I. N.E., S.E., S.O., N.O., 62—II. N.E., S.E., S.O., N.O.; III. N.E., S.E., S.O., NO.; IV. N.E. Price 7*d*. each sheet. (*Dulau.*)

Oesterreichsch-Ungarischen Monarchie.—Specialkarte der——. Scale 1:75,000 or 1 geographical mile to an inch. K. k. militär-geografisches Institut. Wien, 1886. Sheets: Zone 12, Col XXIII. Szendrö und Putnok; 13, XXIII. Miskolc; 14, XXIII. Erlau und Mezö-Keresztes; 16, XXVIII. Hadad und Zsibó; 18,

XXIII. Szarvas; 18, XXIV. Körös-Ladány und Békés; 19, XXIII. Orosháza; 19, XXVII. Belényes und Sulest; 20, XXVII. Vaskóh und Nagy-Halmágy; 32, XIV. I. Solta; 36, XIX. Cattaro; 36, XX. Budua und Cetinje; 37, XX. Spizza. Price 1*s.* 4*d.* each sheet. (*Dulau.*)

Radstadt.—Umgebungskarte von ——. Scale 1:75,000 or 1 geographical mile to an inch. Herausgegeben vom K. k. Militär-geograph. Institut in Wien. Price 1*s.* 6*d.* (*Dulau.*)

Schweiz.—Reisekarte der ——, nach den neuesten Materialien bearbeitet von J. Randegger. Scale 1:600,000 or 8·1 geographical miles to an inch. Zürich, Wurster & Co. Price 1*s.* 6*d.* (*Dulau.*)

Turkey.—Carte Générale des Provinces Européennes et Asiatiques de Ottoman (sans l'Arabie). Dressée par Henri Kiepert. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Troisième édition entièrement refaite. 4 sheets. Berlin: D. Reimer, 1886. Price 10*s.* (*Dulau.*)

This is a new edition of Dr. H. Kiepert's well-known map of Turkey. Having been corrected and revised, where necessary, it is probably the best general map of the Turkish empire that has ever been published; the work being well executed, and the lettering very clear.

ORDNANCE SURVEY MAPS.

Publications issued during the month of October 1886.

1-inch—General Maps:—
SCOTLAND: 122, 124 (Outline), 88 (Hills), 1*s.* 9*d.* each.
IRELAND: 143 (Hills), 1*s.*

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